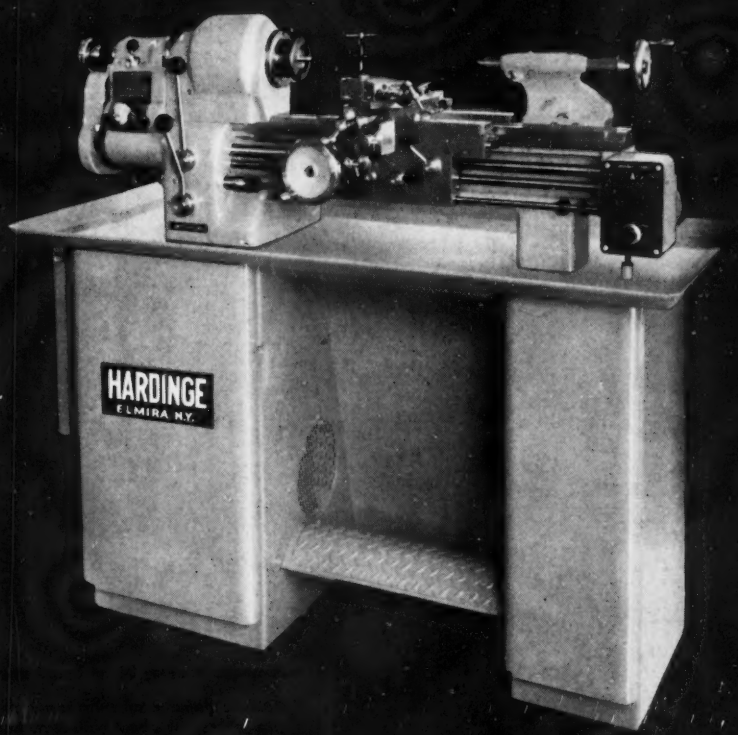
MODERN Machine Shop

December, 1949



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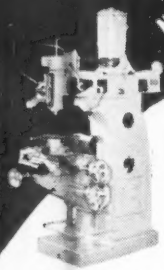
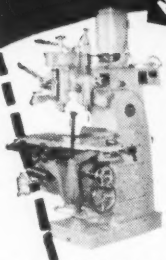


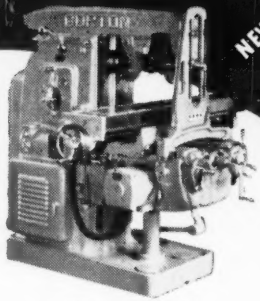
0-16A VERTICAL
Incorporates all of the desirable features of former 8-D. Also available with swivel or universal head. Bulletin 2240.

NEW



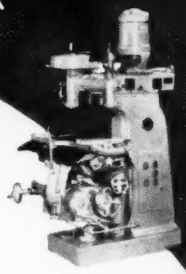
0-16A DUPLICATOR
Rugged, versatile and extra sensitive for exacting die and mold work. Also available with swivel or universal head. Bulletin 1330.

NEW

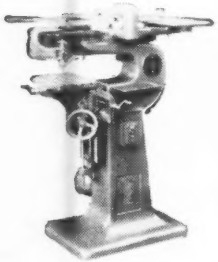


2-28B HORIZONTAL
No. 2 size, fullwidth plain type mill with 10 H.P. spindle drive and speeds up to 2,000 r.p.m. Built for maximum rigidity and a work horse load. Bulletin 2321.

NEW

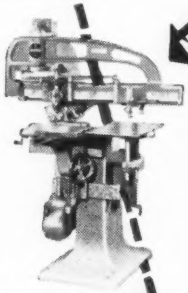


9-J DUPLICATOR
Rugged in construction; has *Gorton super-speed spindle and sensitive controls for the most exacting work. Bulletin 1319.

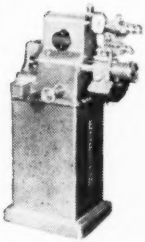


3-U PANTOGRAPH
Sturdy and rigid with sensitive tracer control. Larger and heavier 3-Z model also available. Bulletin 1580.

NEW



P13 PANTOGRAPH
†Ratiobar Pantograph for 3-dimensional work. First basic design improvement in pantograph construction. Bulletin 2310.



375-2 CUTTER GRINDER
Universal type; bench or floor models; capacity up to 5/8" dia., including ball nose and multi-flute cutters. Bulletin 1317.

16-B AUTOMATIC LATHE
For precision turning of long slender parts from .005" dia., by 1/32" long to 7/8" dia., by 2¾" long. Bulletin 1800.

*Trade Mark Reg. U. S. Pat. Office

†Pats. Applied For

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For brief facts about the Gorton line of tracer-controlled machines, use coupon or company letterhead and request Bulletin 1655 illustrated above. For specific information on certain machines, see text accompanying each illustration.

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VOLUME 22 NUMBER 7
DECEMBER, 1949

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Associate Editor

ROBERT I. SHORE
New Equipment Editor

C. W. HINMAN
GILBERT C. CLOSE
Contributing Editors

GENE J. SCHWARBER
Advertising Manager

NORMAN S. ROGERS
Art Director

WILLIAM HARIG, JR.
Circulation Manager

ADVERTISING REPRESENTATIVES

RICHARD S. KLINE
GEORGE E. HAY
431 Main St., Cincinnati 2
MAin 0182

G. M. FILLMORE
342 Madison Ave., New York 17
Murray Hill 7-7390

CHARLES H. DEILY, JR.
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JOHN M. KRINGS
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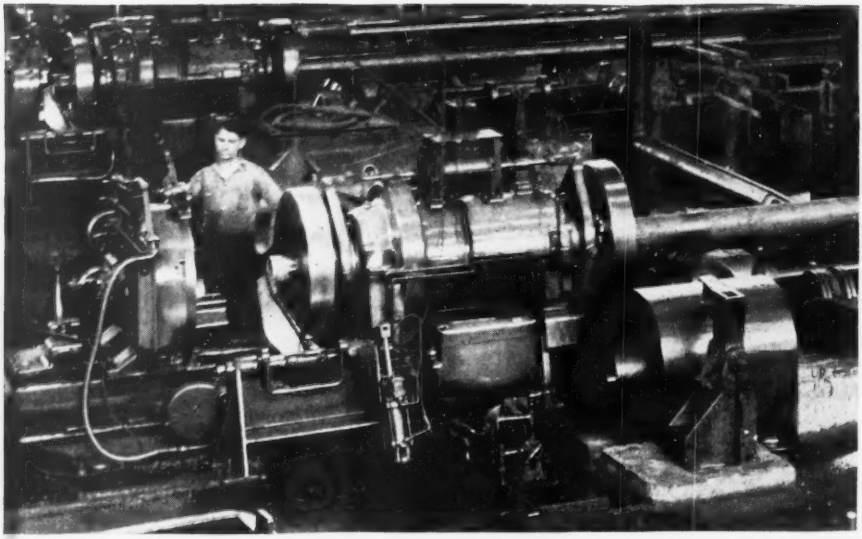

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RETIREMENT AGE

of a Machine Tool?

The real answer depends, not on the old machine...but on THE NEW ONE!

A machine that you purchased 5, 10, or even 15 years ago may still be in excellent condition today—still able to do its job just about as well as the day it was installed. Then why consider retiring it?

For the answer, look at the new machine that should replace it. Will the new one do the job faster—better—at lower cost per part? Retirement is then a matter of simple arithmetic. The new line of Heald machines, for example, incorporates so many new ideas and design improvements that, by comparison, most older machines are no longer economical to operate. And when a machine starts costing you money—that's the time for retirement!

If you're in doubt about the retirement age of any of your precision finishing machines, why not ask the advice of your nearest Heald representative? He will be glad to help you.

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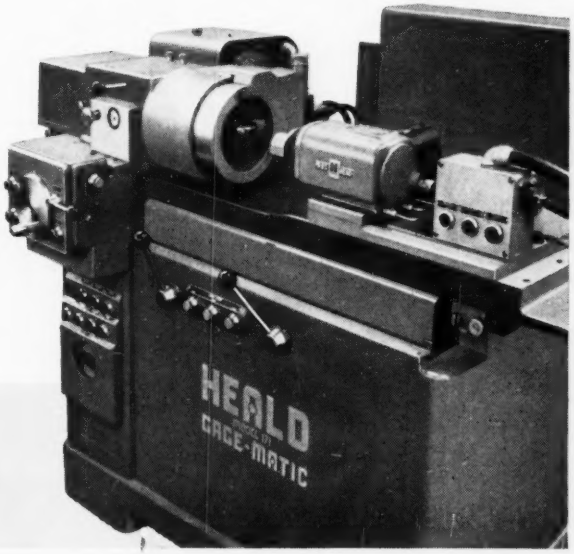

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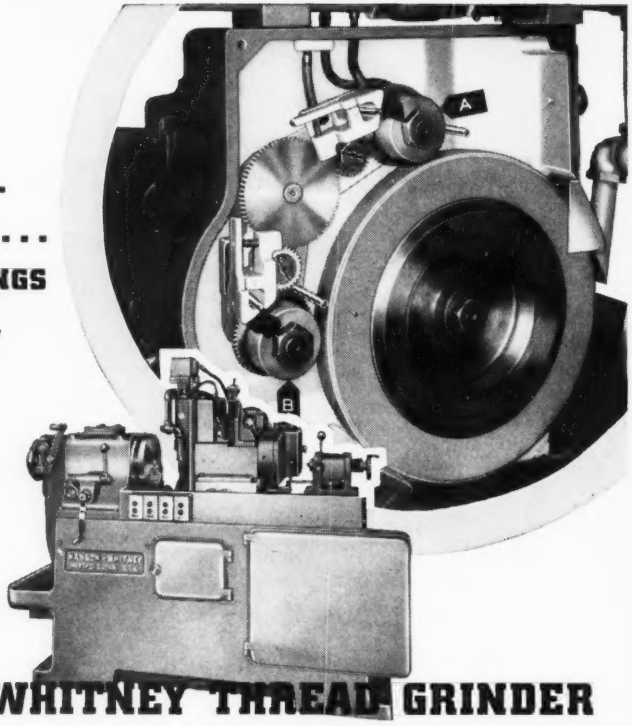

A FEATURE

OF THE

HANSON-WHITNEY THREAD GRINDER

This page has been arranged for but one purpose . . . to induce you to *see* the new Hanson-Whitney semi-automatic Thread Grinder at work. It is impossible, in restricted space, to explain the importance of this engineering achievement . . . to provide the close-up photographs that bring out the many design innovations . . . nor can we show you the accuracy, the speed, the quality of production.

But we *can* arrange an appointment that we believe will interest anyone who needs a better, faster, method for grinding external threads from the solid on a production basis.

You will see a Master Roll (A) that re-trues the Grinding Wheel for regrinding the Crusher Roll (B) in position, whenever its pattern has been worn by repeated crushing of the wheel.

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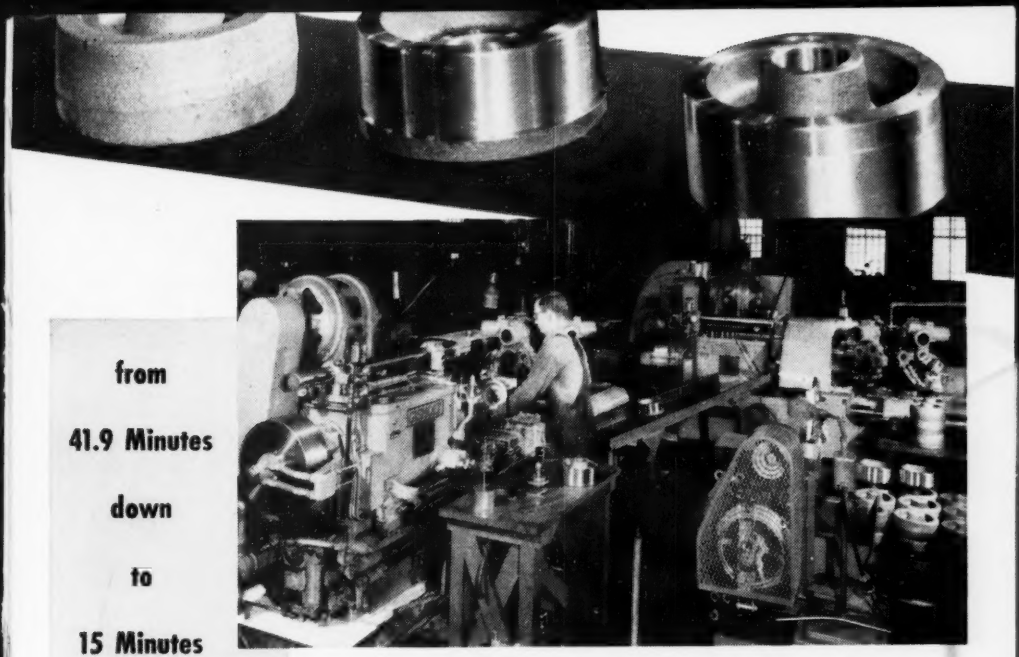
THW4B



from

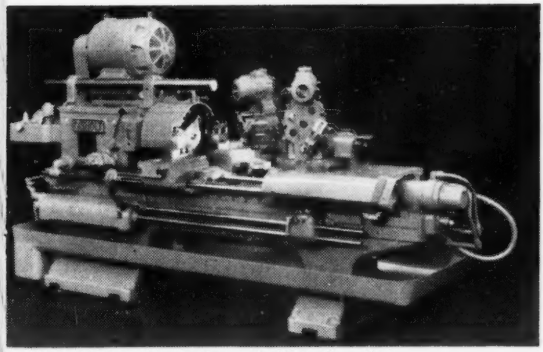
41.9 Minutes

down

to

15 Minutes

That's Productivity with the GISHOLT FASTERMATIC



The Gisholt Fastermatics are built in three sizes ranging from 21" to 36½" swing over bed.

The cost of machining these gear blanks at the Falk Corp. took a sharp drop when the Fastermatics took over. Time was cut nearly two-thirds. Moreover, human errors were eliminated, thanks to Fastermatic's ability to hold close tolerances.

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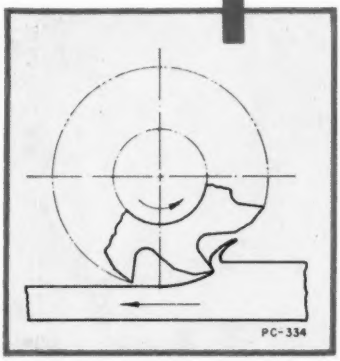


Conventional, or up-milling cut. You know all about this, so just skip to the next drawing.

CINCINNATI No. 5 Plain Dual Power Dial Type. Ask for these catalogs: High Power Dial Type, M-1644. Dual Power Dial Type—M-1647.

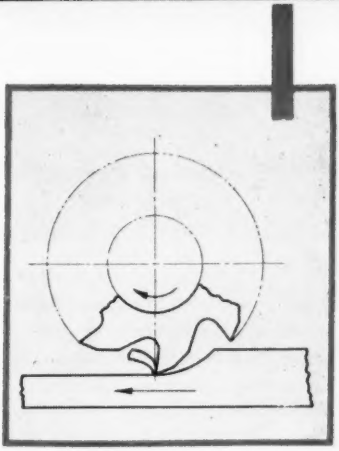
Backlash is bad for table feed screws of milling machines, for it's tough on down-milling operations. With the realization that down-milling is sometimes highly desirable, Cincinnati Milling Engineers developed several automatic backlash eliminating devices, one type of which is incorporated in CINCINNATI High Power and Dual Power Dial Type Milling Machines.

> Through the action of two independent nuts on the table feed screw, a crown gear, meshing with teeth on the two nuts, tends to rotate them in opposite directions. Thus the backlash is entirely eliminated, and down-milling as well as up-milling operations may be assigned to these machines.

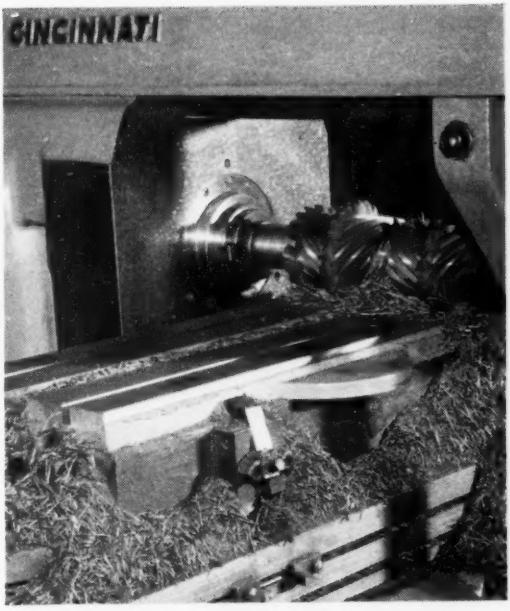
This is but one of the many standard features of value in CINCINNATI High Power and Dual Power Dial Types. Others . . . Dynapoise overarm, automatic table feed cycles. Additional features are outlined in attractive literature. It's yours for the asking.

to cut up

. . . AND CUT DOWN TOO!



Down-milling cut. You'll find this of value in two cases: 1) thin parts, difficult to clamp; 2) where breakout of metal at the end of the cut cannot be tolerated. An example of this type of setup is illustrated at the right.



Milling two cast iron tables at the same time, taking a heavy down-milling cut. The machine is a CINCINNATI No. 5 Dual Power Dial Type.

CINCINNATI

THE CINCINNATI MILLING MACHINE CO.

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Save Unnecessary Work Transfers

INCREASE PRODUCTIVE TIME

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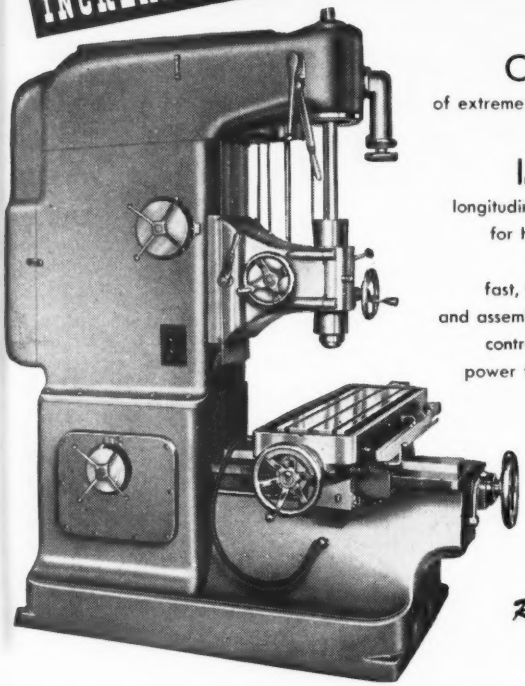

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In the No. 50 are exceptional cross and longitudinal table travel plus long spindle travel for handling an extensive range of work — rugged, rigid bed-type construction for fast, heavy cutting — precision manufactured and assembled for positive accuracy — convenient controls for easy, effortless operation — and power to spare for the heaviest, toughest jobs.

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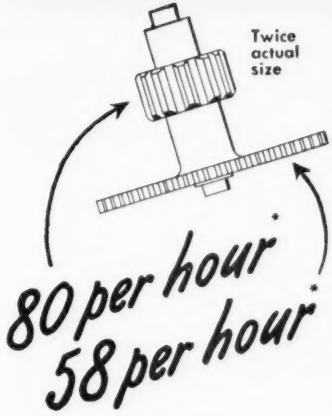

*50% higher output could be attained with less stringent limits

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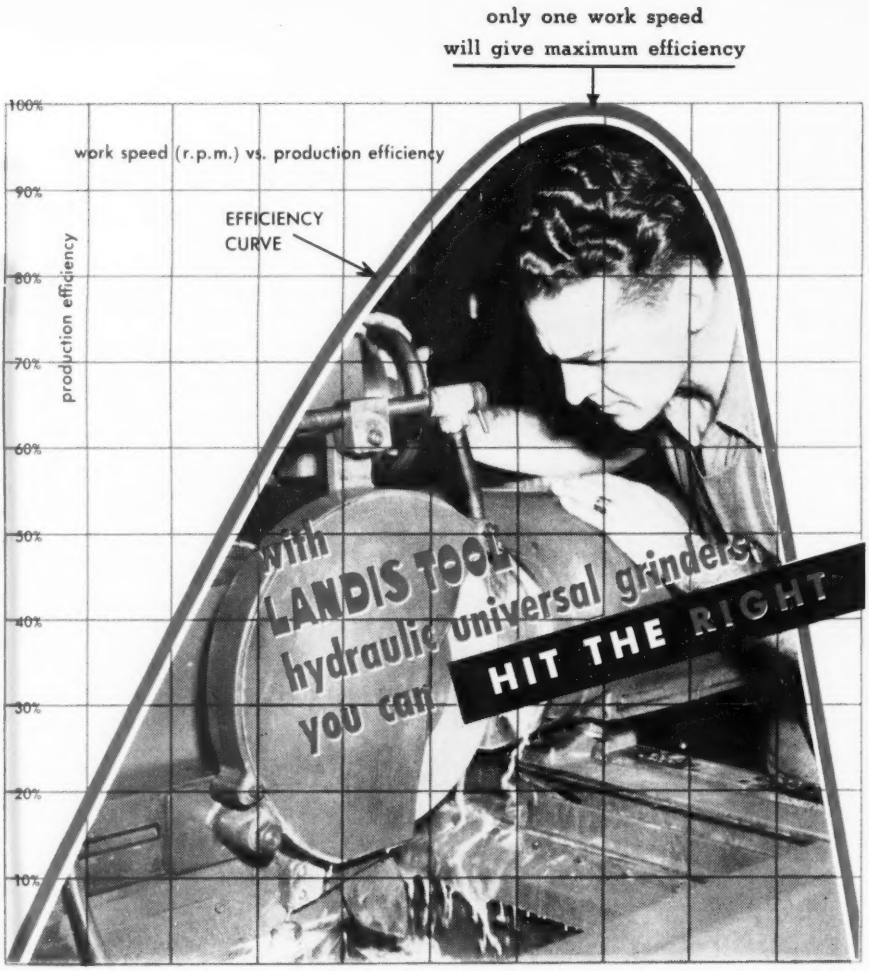

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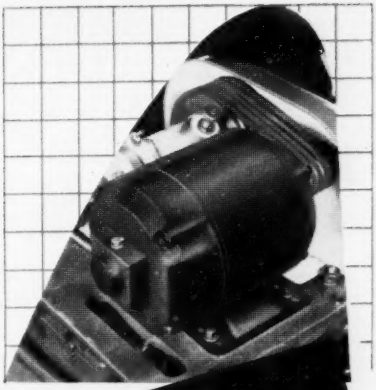

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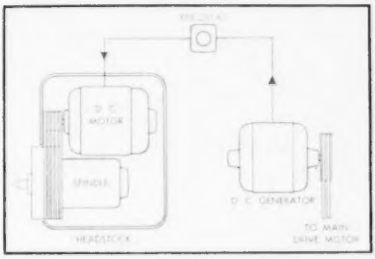
how it works



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3. HYDRAULIC OPERATION
4. VARIABLE SPEED HEADSTOCK
5. RAPID HYDRAULIC WHEEL POSITIONING
6. SWINGING INTERNAL FIXTURE

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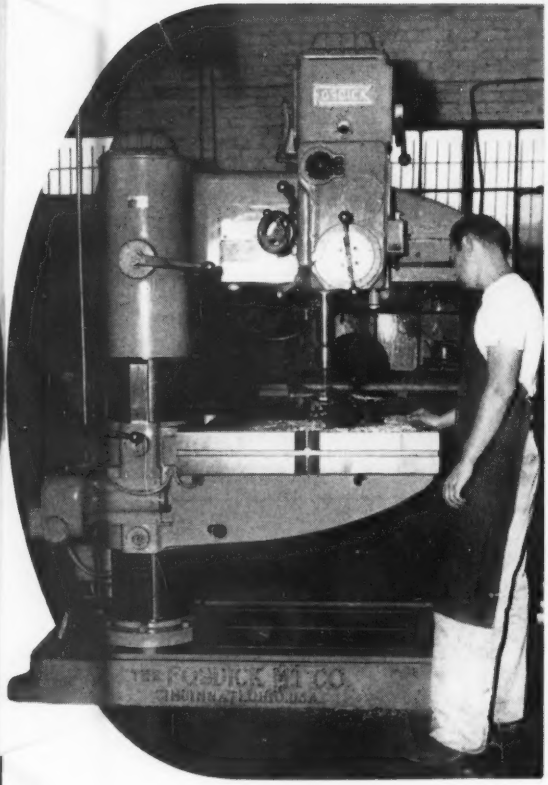
FOSDICK SENSITIVE RADIAL



• Where the work is small and numerous holes are to be drilled the FOSDICK Sensitive Radial is an ideal machine. Moderately priced—it is designed to provide maximum production with the least amount of effort on the part of the operator.

For example all controls for feeds and speeds and movement of the head on the arm are centralized on the head for the convenience of the operator.

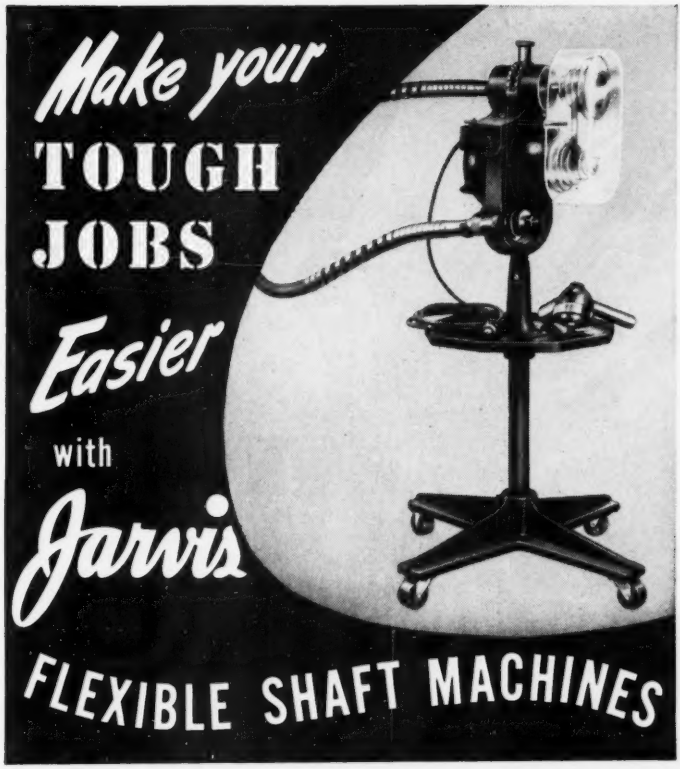
The Arm is located at a fixed height within easy reach of the operator at all times. In addition to the conventional Radial Drill Base the Machine has an adjustable table. Both the table and the arm swing in an arc of 360°.

If you have sensitive drilling operations, requiring holes up to 1½ inch diameter you should investigate the Fosdick Sensitive Radial.

Full descriptive bulletin available. Write for Fosdick Sensitive Radial bulletin S. R. M. M. S.

FOSDICK MACHINE TOOL CO.
CINCINNATI 23, OHIO

Make your TOUGH JOBS Easier with Jarvis FLEXIBLE SHAFT MACHINES



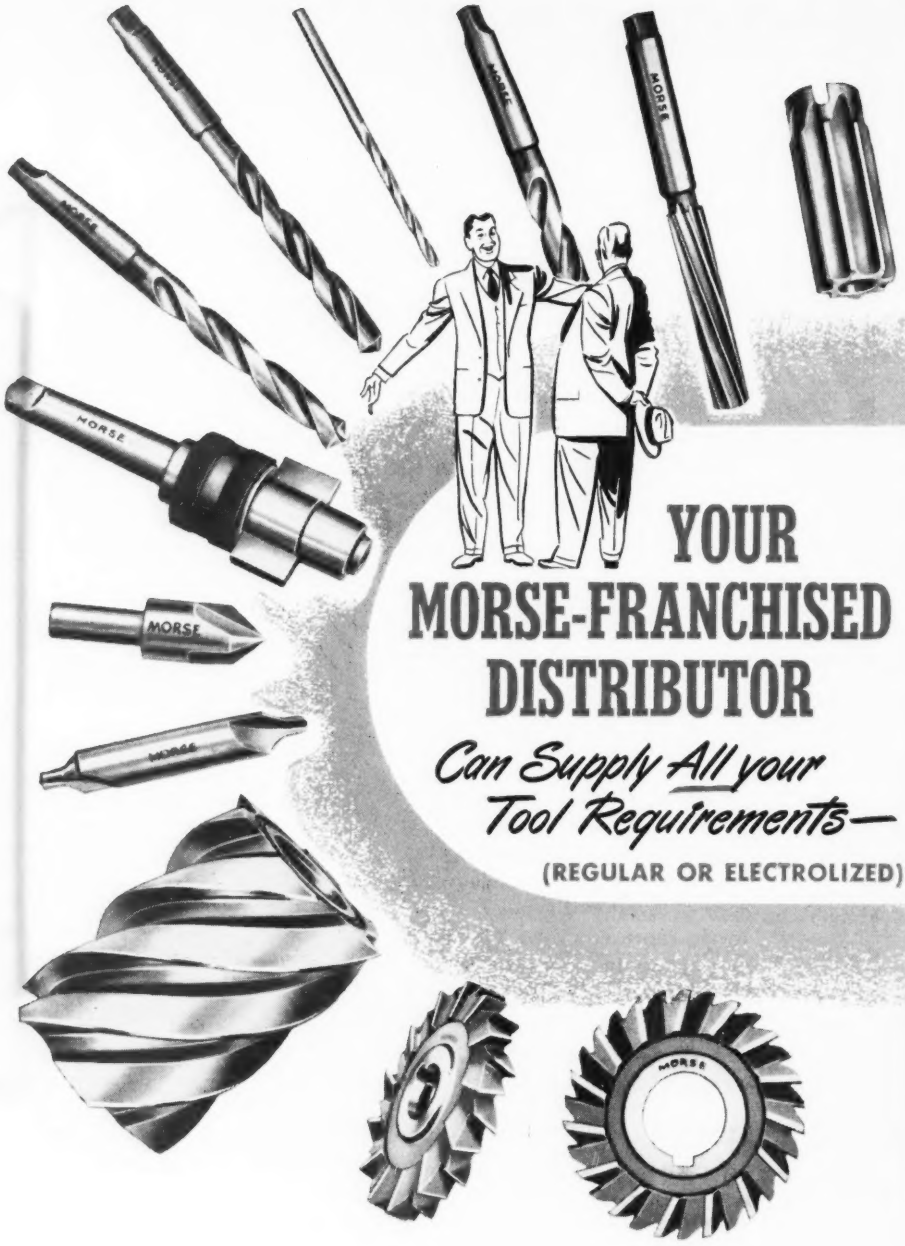
Dependable Jarvis Flexible Shaft Machines make your *tough* jobs easier — do them faster and more economically. Made to meet your individual requirements for grinding, cutting, buffing and many other operations, Jarvis Flexible Shaft Machines are available in bench, floor or overhead types — single or multiple speeds. Factory trained Jarvis representatives are ready to help you select the machines best suited to *your* own applications.

Long-lived Jarvis Rotary Files, depended upon the world over, are available in many shapes and flutings. For detailed information on Jarvis Flexible Shaft Machines and Rotary Files, write to The Charles L. Jarvis Company, Middletown, Conn.

Jarvis POWER TOOLS

TAPPING ATTACHMENTS • TECNI-TAPS and DIES • ROTARY FILES
FLEXIBLE SHAFTS and MACHINES • QUICK CHANGE CHUCKS and COLLETS

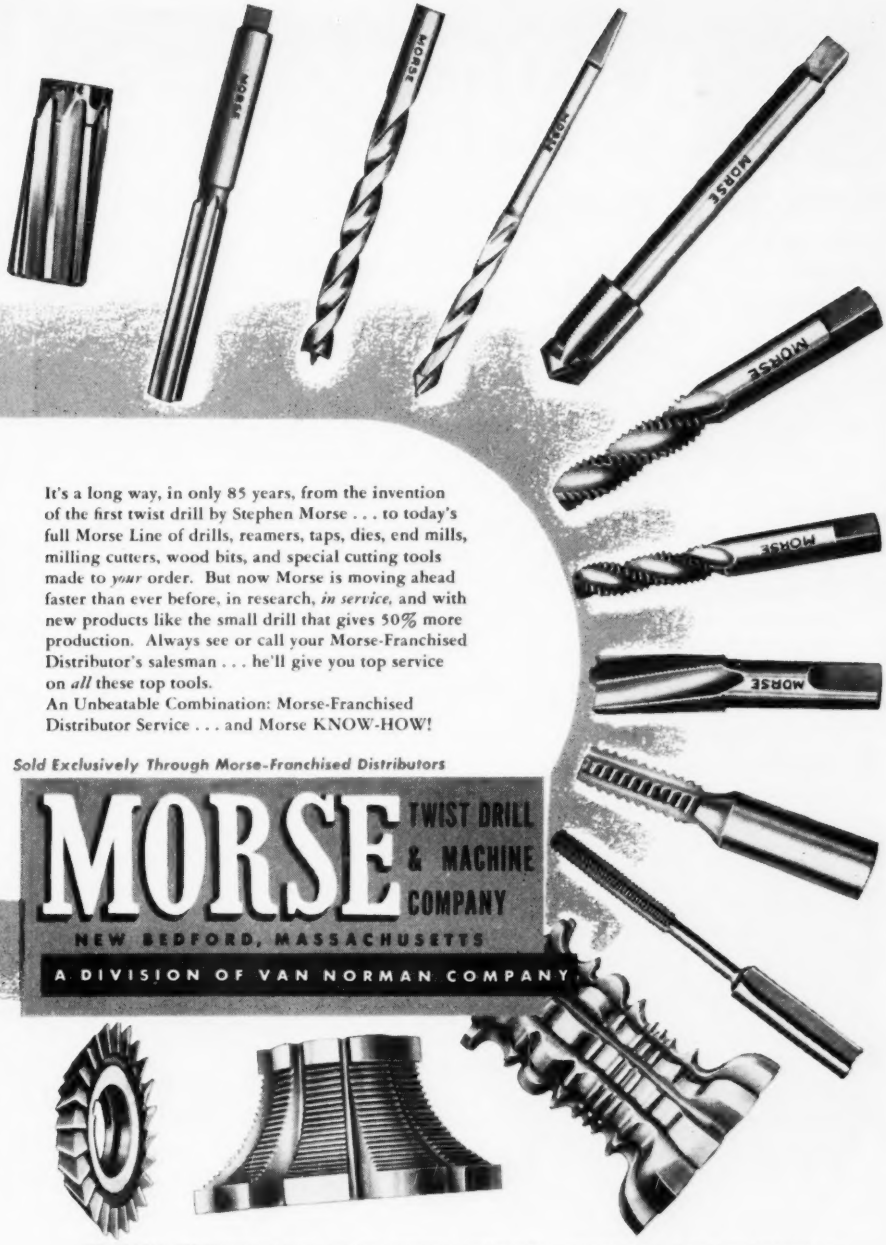
THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT



YOUR MORSE-FRANCHISED DISTRIBUTOR

Can Supply All your Tool Requirements—

(REGULAR OR ELECTROLIZED)



It's a long way, in only 85 years, from the invention of the first twist drill by Stephen Morse . . . to today's full Morse Line of drills, reamers, taps, dies, end mills, milling cutters, wood bits, and special cutting tools made to *your* order. But now Morse is moving ahead faster than ever before, in research, *in service,* and with new products like the small drill that gives 50% more production. Always see or call your Morse-Franchised Distributor's salesman . . . he'll give you top service on *all* these top tools.

An Unbeatable Combination: Morse-Franchised Distributor Service . . . and Morse KNOW-HOW!

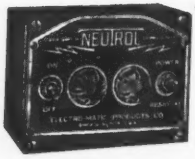
Sold Exclusively Through Morse-Franchised Distributors

MORSE TWIST DRILL & MACHINE COMPANY

NEW BEDFORD, MASSACHUSETTS

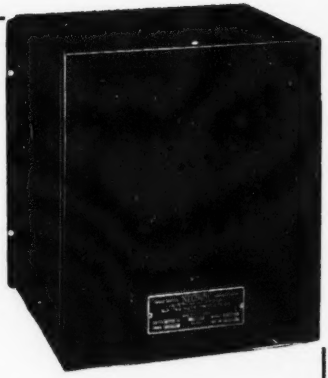
A DIVISION OF VAN NORMAN COMPANY

BRANCH WAREHOUSES: NEW YORK, DETROIT, CHICAGO, SAN FRANCISCO



NEUTROL
Magnetic
Chuck
Controls

WHEREVER MAGNETIC CHUCKS ARE USED



THE ELECTRO-MATIC RECTIFIER AND NEUTROL MAGNETIC CHUCK CONTROL ARE INDISPENSABLE FOR BETTER AND SAFER GRINDER PERFORMANCE

NEUTROL Magnetic Chuck Controls speedily release and demagnetize workpieces. With NEUTROL, there's no need to hammer or pry to release the work. This saves time and tempers—saves marred, distorted workpieces and prevents damaging of chuck faces. NEUTROL also protects chucks against harmful voltage surges.

ELECTRO-MATIC Rectifiers are sturdy, heavy duty, direct current supply units, engineered to "stand up" day-after-day in the hardest service. They are available in any desired voltage combination in capacities ranging from 50 to 20,000 watts.

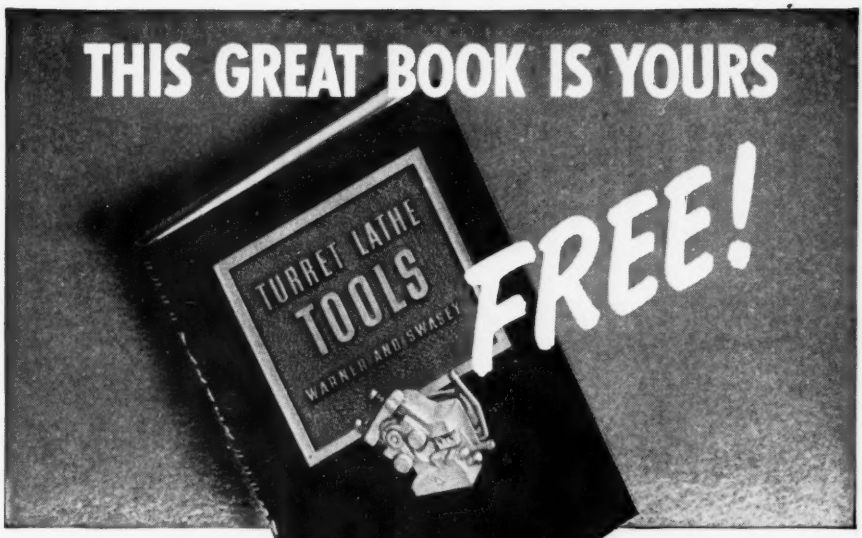
NEUTROL and ELECTRO-MATIC Rectifiers can be installed easily on equipment already in use — or built into new machines before delivery if you so specify.

Let us send bulletins giving full information—no obligation.

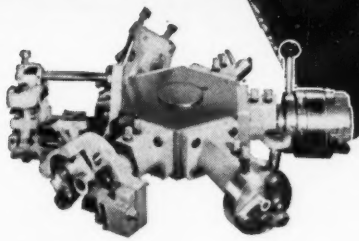
ELECTRO-MATIC PRODUCTS CO.
2237 North Knox Ave., Chicago 39, Ill.

ELECTRO-MATIC
Industrial
Rectifiers

THIS GREAT BOOK IS YOURS



FREE!



WARNER & SWASEY STANDARD TOOLS *pay off!*

You can machine it Better, Faster, for Less... with a Warner & Swasey

WARNER & SWASEY
Machine Tools
Cleveland

Turret Lathes — Multiple and Single Spindle Automatics — Precision Tapping and Threading Machines.

Warner & Swasey standard turret lathe tools, and Universal Tooling Setups, can increase *your* production as they have in many other shops. Write today for the 184-page book, "Turret Lathe Tools" which clearly and simply explains Universal Tooling principles for bar and chucking work, combined and multiple cuts, and applications of modern tooling. Use this handy coupon!

Department 328
Warner & Swasey, Cleveland 3, Ohio
Please send my free copy of "Turret Lathe Tools" today!

Name .....
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M-12-49

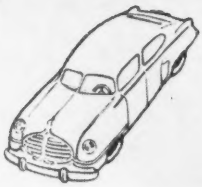
PRODUCTIVITY

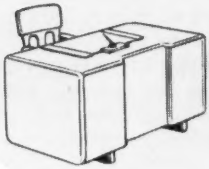
THAT BRINGS UNIT COSTS DOWN!

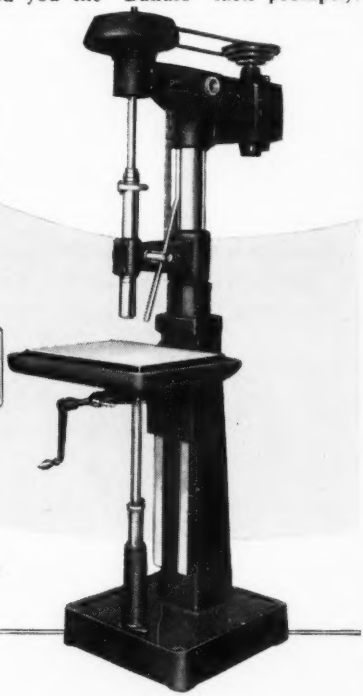
WHEN all is said and done, what the production manager needs in his drilling operations is the maximum number of holes per day. The greater the productivity, the lower are the unit costs in that department.

That's why, in plant after plant, the choice of drills has been "Buffalo". Ease of handling—simplicity of setup adjustments—rigid, rugged construction for lifetime accuracy—are the reasons.

If you want this profitable productivity, write us about your drilling operations, and we'll send you the "Buffalo" facts promptly.





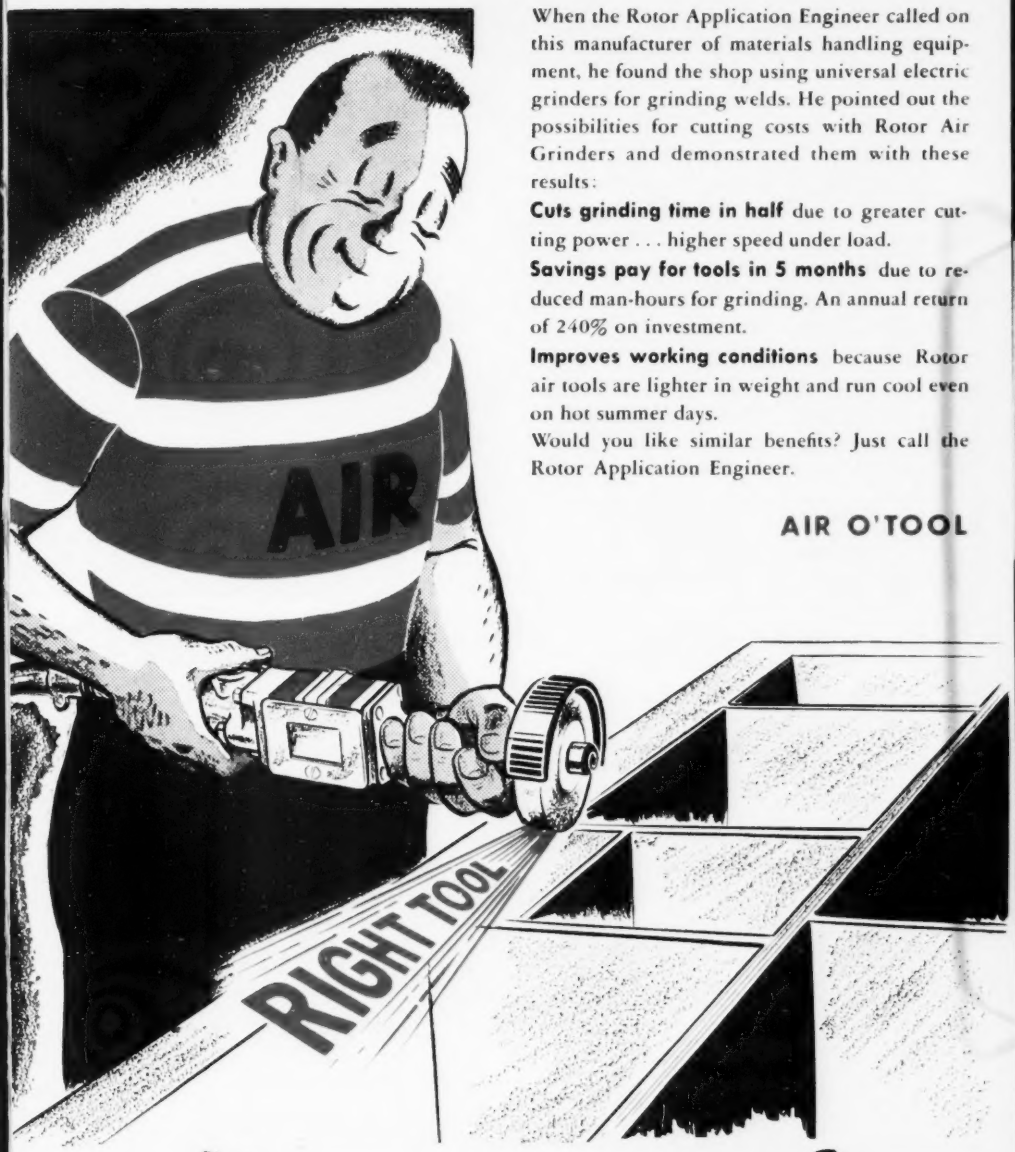


BUFFALO FORGE COMPANY

388 BROADWAY BUFFALO, NEW YORK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Pays for itself in *5 months*



When the Rotor Application Engineer called on this manufacturer of materials handling equipment, he found the shop using universal electric grinders for grinding welds. He pointed out the possibilities for cutting costs with Rotor Air Grinders and demonstrated them with these results:

Cuts grinding time in half due to greater cutting power . . . higher speed under load.

Savings pay for tools in 5 months due to reduced man-hours for grinding. An annual return of 240% on investment.

Improves working conditions because Rotor air tools are lighter in weight and run cool even on hot summer days.

Would you like similar benefits? Just call the Rotor Application Engineer.

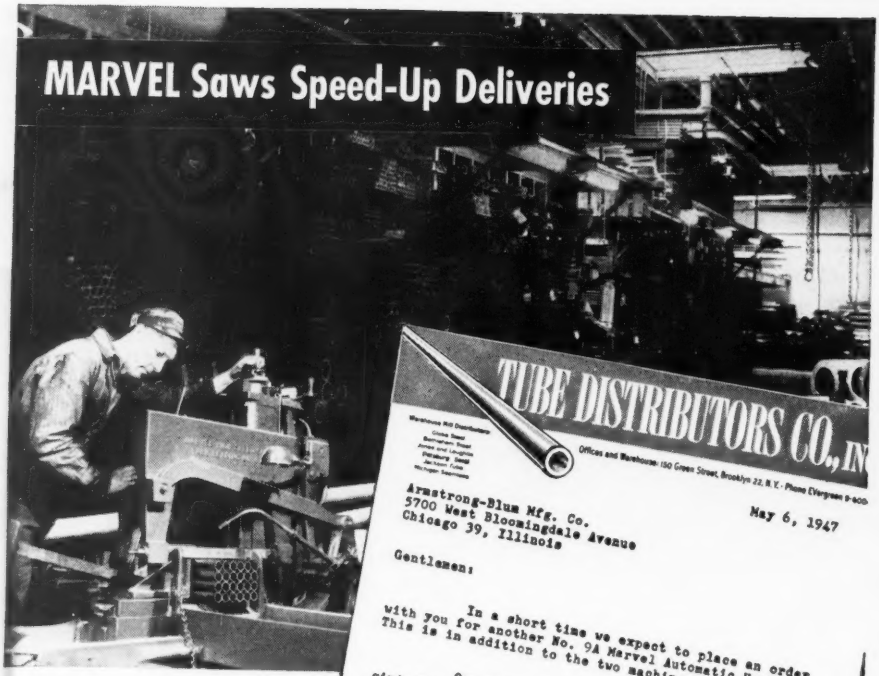
AIR O'TOOL

THE ROTOR TOOL CO.

CLEVELAND OHIO

PIONEER PLANNERS OF PORTABLE AIR TOOL ENGINEERING

MARVEL Saws Speed-Up Deliveries



TUBE DISTRIBUTORS CO., IN

Offices and Warehouse: 150 Green Street, Brooklyn 22, N.Y. - Phone EVergreen 8-900

May 6, 1947

Armstrong-Blum Mfg. Co.
5700 West Bloomingdale Avenue
Chicago 39, Illinois

Gentlemen:

In a short time we expect to place an order with you for another No. 9A Marvel Automatic Hack Saw. This is in addition to the two machines we now have.

Our present Marvel Automatic Hack Saws are giving us very satisfactory service, enabling us to speed cutting of mechanical and boiler tubes to our customers' required lengths at a minimum of cost, both for labor and blades.

Your service and attention to our requirements have been very satisfactory.

Sincerely,

TUBE DISTRIBUTORS CO., INC.

A. F. Lewis

AFL:CB

Superintendent

Steel warehouses and stockrooms deliver cut-off lengths in any quantity FASTER—BETTER—CHEAPER when equipped with MARVEL 6A and 9A Automatic Hack Saws. Far faster, floor to floor, than any other hack saws, they save valuable machine hours by reducing cutting-off time to a fraction—save other machining hours by producing accurately cut pieces of exact length.

There is a MARVEL Saw for every need—in every capacity range and price class. Your local MARVEL Sawing Engineer will gladly study your metal sawing problems and requirements and make recommendations as to methods and equipment.

MARVEL *Metal Cutting* SAWS

Better Machines—Better Blades

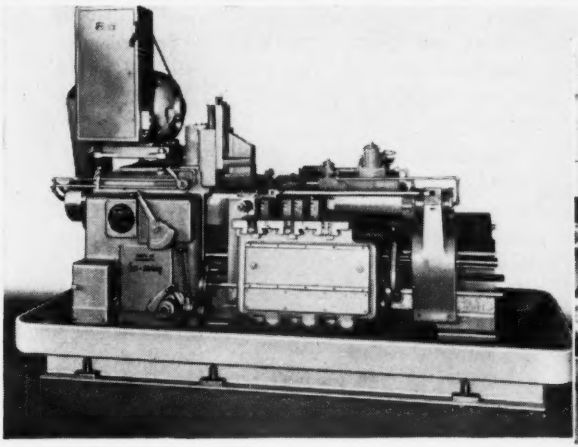
ARMSTRONG-BLUM MFG. COMPANY

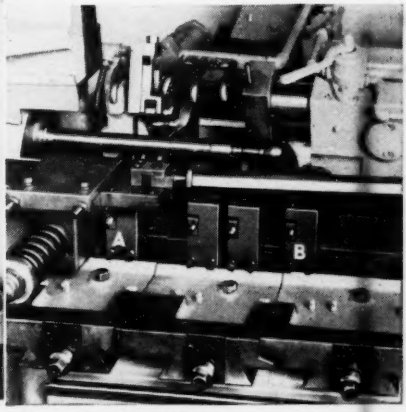
"The Hack Saw People"

5700 BLOOMINGDALE AVENUE CHICAGO 39, U. S. A.

MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE *Lo-swing* PEOPLE" SENECA FALLS, NEW YORK





MODEL "AR" *Lo-swing* SLASHES COSTS ON MAIN DRIVE SHAFT

Problem: To offset high labor costs by increased production on Main Drive Shaft.

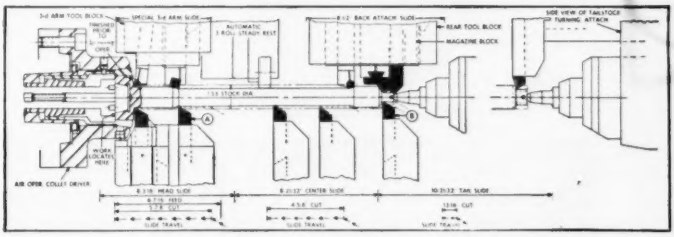
Solution: The Model "AR" Automatic Lo-swing Lathe was selected for this job because it had sufficient weight and rigidity to insure long tool life at high cutting speeds with sintered carbide tools.

Shafts are delivered to the Lathe with the gear end finished to size and the small end centered. The line drawing shows a cross section of the collet chuck which centers and drives the shaft on the gear end. This method of driving increased the rigidity of the shaft. The three-roll steady rest is automatically operated, the rolls being advanced to contact the shaft as soon as tool "A" turns a spotting wide enough to clear the rolls. Tool "A" is the only tool cutting until the steady rest rolls support the piece, after which all the other tools start cutting simultaneously.

Another feature on this machine is the Automatic Tailstock Turning Attachment, shown in the close-up illustration, which is used to rough turn the small end of the shaft ahead of tool "B" which finish turns. This small diameter is held within close limits by this method and a green grind operation is eliminated.

The complete cycle is automatic; the operator simply loads and unloads the parts and pushes the starting button. All tools are carbide. Material is SAE 5140 steel forging and the machine cycle time is 30 seconds.

If you want lower production costs, let us help you with your turning problems.



SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

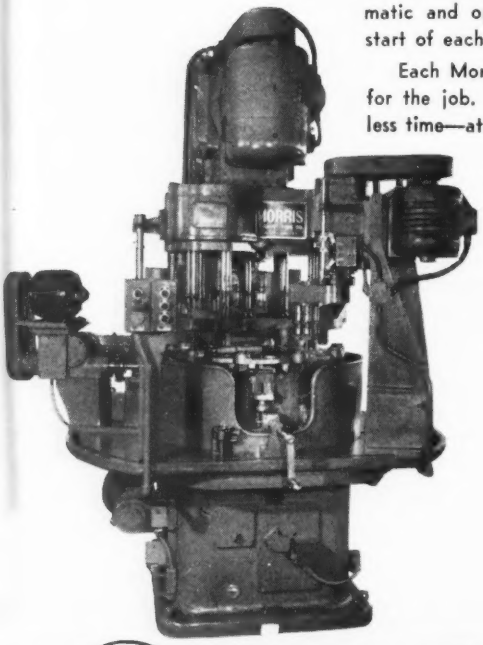
PRODUCTION COSTS ARE LOWER WITH *Lo-swing*

DESIGNED TO MEET YOUR SPECIFIC NEEDS

This 10 station Vertical Hydraulic Automatic machine shown completes FIVE operations — drilling — boring — reaming — chamfering — tapping — on an automobile Oil Pump Housing and turns out a finished piece at each index of the machine. The operator merely loads and unloads the work by means of a hand clamp arrangement which operates the ten hand clamp fixtures.

The machine is equipped with twelve vertical drilling and boring spindles, two vertical reaming spindles, four vertical tap spindles and one horizontal drill spindle all of which operate simultaneously on a work piece as it is indexed from one position to another. Aside from hand clamping all operations are automatic and operator merely presses a button at the start of each cycle.

Each Morris high production machine is designed for the job. The result is more completed parts—in less time—at lower costs.



MORRIS

MOR-SPEED PRODUCTION MACHINES

•

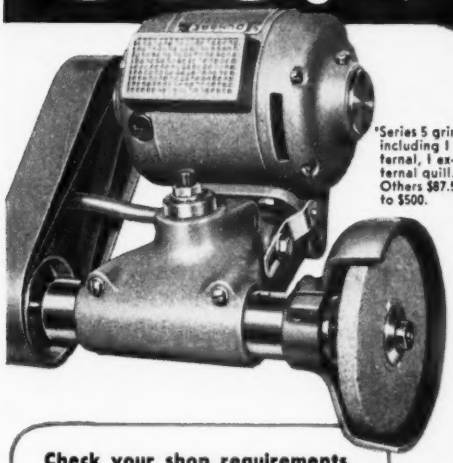
Consult Morris on your high production work. They have the engineering experience — the plant facilities — and organization to help you reduce costs on high production work.

Builders of MOR-SPEED Lines

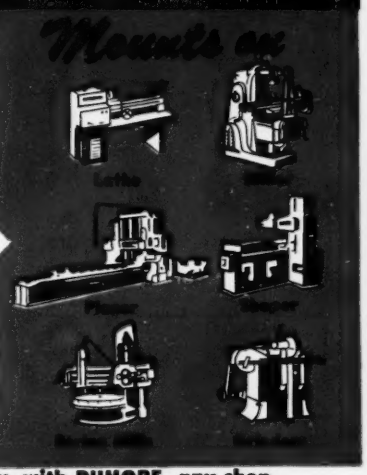
The MORRIS Machine Tool Co.

CINCINNATI 3, OHIO

$310* puts .0001" precision grinding in your shop



*Series 5 grinder including 1 internal, 1 external quill. Others $87.50 to $500.



Check your shop requirements against these DUMORE features

LOW COST — Versatile Dumores cost as little as 1/50th of single-purpose grinder price.

.0001" ACCURACY — Dumores enable you to grind to the closest practical precision limits.

MICRO-FINISH — Dumores will enable you to obtain the finest ground finish on your work.

WIDE WORK RANGE — Handles cylindrical, internal, external, form, and surface grinding.

ADAPTABILITY — A Dumore mounts on any of your basic shop machines.

HIGH PRODUCTION — Hundreds of Dumores are in daily use on production jobs of every type.

SERVICE — Wherever you are, Dumore parts and service instantly available.

Now, with DUMORE, any shop can afford precision grinding

For small shops it means more jobs to bid . . . tool and die facilities . . . more profits.

In large shops it frees expensive machines for long runs . . . uses idle machines . . . handles "one-shot" jobs . . . cuts maintenance costs.

See for yourself how Dumores turn out work faster, better and cheaper.

Write today.

Mail Today

The DUMORE COMPANY, Dept. M-33, Racine, Wis.

☐ Please send me information on how Dumore Precision Grinders can cut my tool and work costs.

☐ Please arrange for free demonstration in my own shop. I'm particularly interested in ☐ Toolroom ☐ Production ☐ Maintenance applications.

NAME..... TITLE.....

COMPANY.....

STREET.....

CITY..... STATE..... DG-1

DUMORE

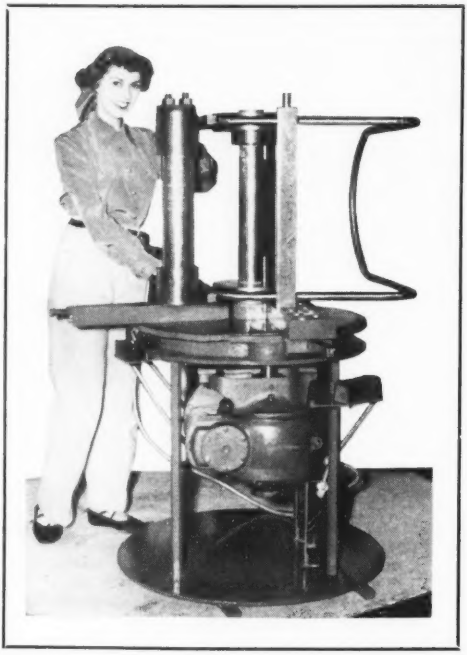
In a Bender

IT IS PRODUCTION THAT COUNTS

It is well said that "Materials are cheap but Time costs money".

The more pieces you can make in a given time, the less each piece will cost. To do this, you must have a machine that does simultaneously as many operations as possible. A PEDRICK PRODUCTION BENDER is such a machine.

The illustration shows a machine making tubular furniture, in which the vertical bends are made simultaneously. This eliminates expensive jigging and time consumed in setting the piece against the jig. Furthermore, it eliminates "throw out" where inherent strains distort the finished product during the bending operation. This same saving is effected in the bending of double-offset expansion bends in pipe lines, structural frame works in angles and channels, as well as a host of others.



The PEDRICK BENDER does everything except think. Our standard machines are "one button" units where the machine completes its cycle after the starting button is pressed. Full automatics may also be had where no operator is required.

Write for descriptive literature

PEDRICK TOOL and MACHINE CO.
3640 N. Lawrence Street • Philadelphia 40, Pa.

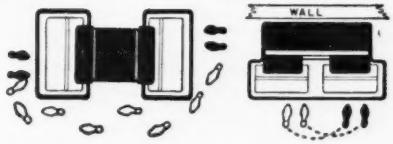
SEE FOR YOURSELF

FROM ROUGH TO FINISH GRIND IN ONE STEP!

- HEAVY DUTY
- WET OR DRY
- 10" · 14" WHEELS

Type 10 TD

PROMPT DELIVERY



OLD WAY

Lost time between rough and finish grind.

Floor space wasted — Grinder must be away from wall.

NEW WAY

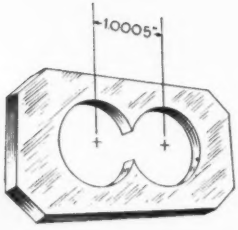
One step from rough to finish grind.

Conserve floor space— place Grinder against the wall.

BULLETIN 18 IS JUST OFF THE PRESS! WRITE TODAY!

THE STANDARD ELECTRICAL TOOL CO.

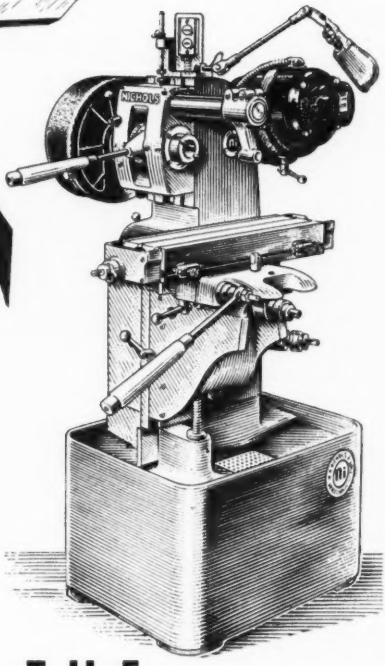
2487 RIVER ROAD **CINCINNATI 4, OHIO**



Put jobs like this...

Two intersecting punched holes are reamed to size and location within .0005". The stainless steel work piece is held in a table fixture and fed into the cutter by transverse lever feed. ¼" of stock is removed on the diameters. Production is 700 pieces per nine-hour shift on a Nichols Production Model Miller.

on "the miller that uses its head"



Because the Nichols Miller is endowed with an unusual versatility, by virtue of its unique rise-and-fall spindle, it is often a "jack of all trades" in a shop. In addition to conventional milling, it is used for such varied jobs as profiling, drilling, reaming, turning, boring, facing, key seating, broaching and vertical milling. Yet this same machine is designed so functionally and built so accurately that it is used for high production of precision parts with tolerances to "tenths."

Nichols Millers are made in the following models, all having the same basic features but modified especially for particular requirements: The Standard Model for general shop use; the Tool Room Model with special table and extra large micrometer dials for finer measuring control; the Semi-Automatic Model equipped with automatic pneumatic table feed; the Production Model with lever longitudinal and transverse feeds; and three Double Spindle Models for use where the simultaneous action of two cutters is practical.

MANUFACTURED BY W. H. NICHOLS COMPANY
WALTHAM, MASSACHUSETTS

CONDENSED SPECIFICATIONS

Table Working Surface	6¾" x 21" or 30"
Longitudinal Travel (screw or lever)	10" or 19"
Transverse Travel (screw or lever)	7"
Vertical Travel — Knee	13½"
Rise and Fall of Spindle	4½"
Selective Speed Ranges up to 5000 R.P.M.	
Weight	1250 lbs.

THE *Nichols* MILLER

Write today for new Nichols Miller Catalog which describes in detail all five models of "The Miller that uses its Head."

WHY LENOX HACKMASTER USERS ARE—

Sitting on top of the World!

ECONOMY

Do not break – no loss from breakage of partially worn blades.

DURABILITY

Made of High Speed Steel that will outlast several standard grade blades.

SAFETY

Will not shatter in use. No bruised hands or other accidents.

High Speed Steel

★ *Unbreakable*

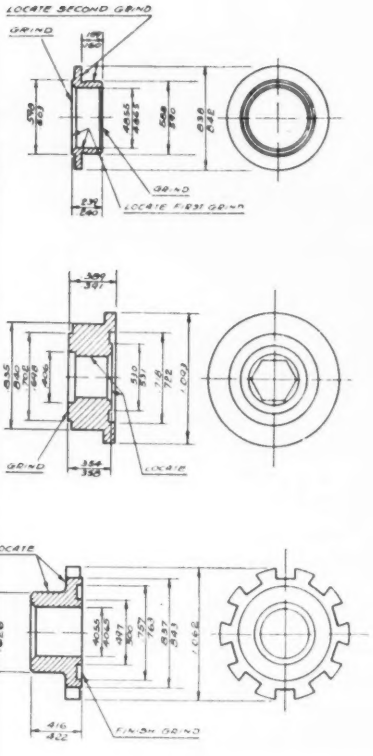
Lenox Hackmaster

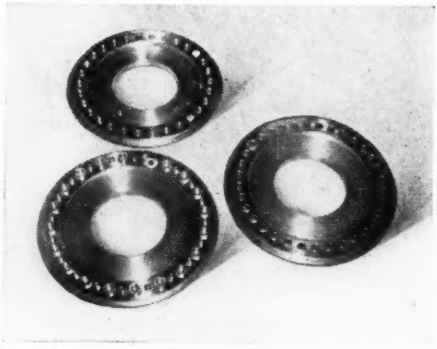
"A DIFFERENT HAND HACK SAW BLADE"

AMERICAN SAW & MFG. COMPANY · SPRINGFIELD, MASSACHUSETTS

HACK SAWS · BAND SAWS · FLAT GROUND STOCK · TOOL BITS

Hold Everything! *with* *Walker Chucks*





Auxiliary plates 13″ diameter to operate on Walker Rotary Magnetic Clutch

Walker engineers have put magnetic holding right into the realm of precision grinding.

Mechanical engineering development strives toward closer tolerances. This is an age of "millionths" and Walker advances with this progress.

These precision parts could only be held for mass production by the utilization of magnetism. Walker's long experience met the challenge and Walker engineers **DID IT AGAIN.** The saving effected by the use of Walker engineers, service and products pays off in added efficiency.

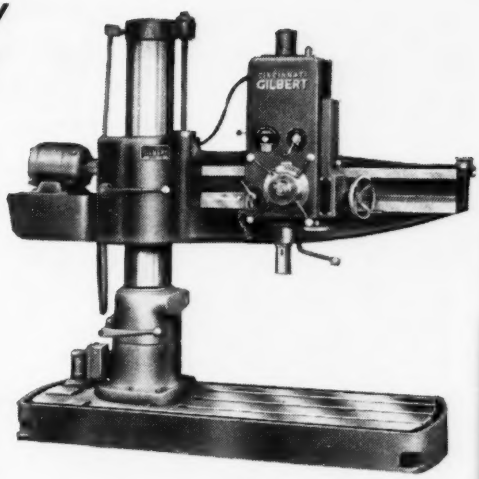
May we cooperate with you?

O. S. WALKER CO. Inc.

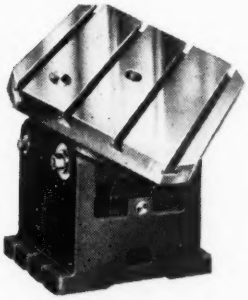
WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

"repeat-business" quality runs in the family



Radial Drilling Machines, 9" and 11" columns. Centralized controls. Maximum visibility of work. 12 speeds, 6 feeds. Twelve basic features that make these machines the most modern radials you can buy. Radials with 13" to 19" columns, with arms up to 8' also furnished. Write for bulletin 349.



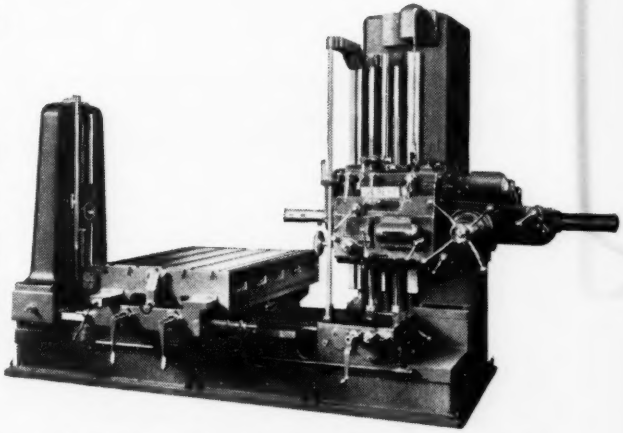
(Above) Universal Table. Five sides of a cube can be machined at one setting of work piece. Sizes: 22" x 22" and 27" x 27" top.

THE CINCINNATI

GILBERT

MACHINE TOOL COMPANY

RADIALS • HORIZONTAL BORING MILLS • ACCESSORIES



Horizontal Boring Mill, Compound Rectangular Table Type. Head travel: 36" to 72". Bed: 84" to 120". Spindle diameter: 3½" or 3¾". Write for Bulletin 1040-R. Floor type (Bulletin 1244B) and compound built-in rotary table types (Bulletin 348) also furnished . . . Write to the Cincinnati Gilbert Machine Tool Co., 3366 Beekman St., Cincinnati 23, Ohio.

THOSE WHO BUY GILBERT, BUY GILBERT AGAIN

has your shop got the "TOOL ROOM TROTS?"

How much time is wasted "on the road" while punch press operators and set-up men go back and forth to the tool room to get punches and dies for a short run set-up?

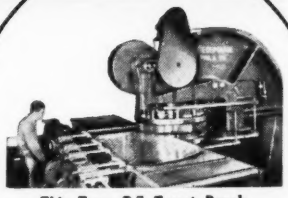
SEE A WIEDEMANN

With a Wiedemann Turret Punch Press, the operator remains at the machine . . . no need to make numerous time consuming "trips," since 12 to 32 punches and dies are carried in the turret . . . ready for instant piercing . . . always at the operator's fingertips. In addition, a Wiedemann saves you hours of lay-out time. On some machines, layout time is completely eliminated because of material handling gauge tables that position the material ready for piercing by obtaining the X and Y coordinate from blueprints or charts.

WIEDEMANN MACHINE COMPANY

4219 WISSAHICKON AVENUE • PHILADELPHIA 32, PA.

• Send today for the complete story of short run piercing economy . . . and then if you'd like to see a Wiedemann in operation, we'll tell you the shop nearest you that does short run piercing with a Wiedemann.



This Type R-7 Turret Punch Press cut production time from over 12 hours to 73 minutes on short run jobs. Get the proof!

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THERE are three major reasons why it's to your advantage to "Call Us" for all your alloy steel requirements:

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Yes, it pays you to "Call Us" when you need alloy steels. Our nearest warehouse or sales office is constantly at your service. So, phone, wire or write for prompt action. Meanwhile, your requests for literature will receive immediate attention. Just fill in and return the coupon. There's no obligation.

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We've put a "BRAIN" in the famous Cone Head

HENDEY
No. 2
GENERAL
PURPOSE
LATHE

The Hendey No. 2 General Purpose Lathe is a worthy, "brainy" successor to the world famous Hendey Cone Head Lathe. This new lathe has all the facility of the cone head, but has a single lever for instant belt shifting. It has eight speeds, but no expensive geared head. There is an independent motor in the base, plus a unique feature which eliminates belt pull on the spindle. There are 48 thread and feed changes, and graduations permit spindle indexing for cutting multiple threads. The bed ways, both carriage and tailstock, are hardened and precision ground. The "brain" in the No. 2 is your assurance of maximum profits with minimum operator fatigue—the Hendey name is your assurance of highest precision. Write today for details and catalog.

PRINCIPAL DIMENSIONS

Rated size	14"
Swing over ways	16 7/16"
Swing over cross slide	10 1/4"
Spindle bearings—Preloaded super-precision roller bearings	
Spindle nose	L-1 taper nose
Hole through spindle	1 1/2"
Range of spindle speeds	30 to 1142 R.P.M.
Carriage bearings on ways	21 1/2"
Width and length of cross slide	7"
Compound rest travel	4"
No. of thread and feed changes	48
Range of thread cutting	1 1/2 to 92

THE *hendey* MACHINE COMPANY

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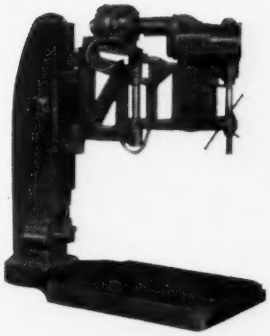
hendey

A very accurate 6" x 18" Hand Feed Surface Grinder especially adaptable for Tool Room Work and work on small, fussy pieces.



A Unique Radial Drilling Machine with Hinged Bracket that makes it possible to swing quickly from hole to hole over a wide area. A very convenient tapping arrangement is incorporated in this machine.

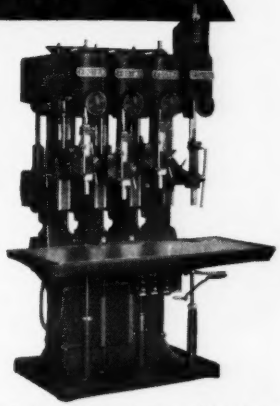
A TIME TESTED LINE OF MACHINE TOOLS

Engineered for Production

• The choice of fine machine tools is an investment for future profits when products have to be made with increased accuracy and efficiency.

These machines are built with the usual Footburt workmanship and sturdiness that will keep them accurate over a long period.

THE FOOTE-BURT COMPANY
Cleveland 8, Ohio
Detroit Office: General Motors Building



Built in 1, 2, 3, 4 and 6 spindle models, also as a tool room drilling machine, these sensitive drilling machines are accurate for the most exacting work and have the usual Footburt sturdiness of construction to make them suitable for continuous production line work. The above 4 spindle machine has tapping attachment and power feed attachment.

A TIME TESTED LINE OF MACHINE TOOLS

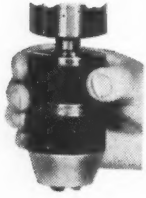
FOOTBURT
MACHINE TOOLS

ENGINEERED FOR PRODUCTION

NEW HORTON PROCESS SAVES CHUCK WEAR ... Here

FLAME HARDENED JAW WAYS

FOR LONGER EFFECTIVE CHUCK LIFE



Horton engineers have taken the wear out of the chuck's most vulnerable point . . . the jaw way. The ways of your lathe are hardened to give you long, accurate life. This same hardening process is now used by Horton to **prolong** your chuck's initial **accuracy** and **gripping power** — two highly important factors in chuck operation.

To further assure maximum life and dependability Horton uses only the finest alloy steel; all parts are properly heat treated for toughness; exacting inspections at five different stages of assembly are standard procedure. The **Flame-Hardened Jaw Way*** is but one more reason for choosing Horton Chucks.

* Available on request at only slight extra cost.

Write today for a copy of the new Horton catalog.

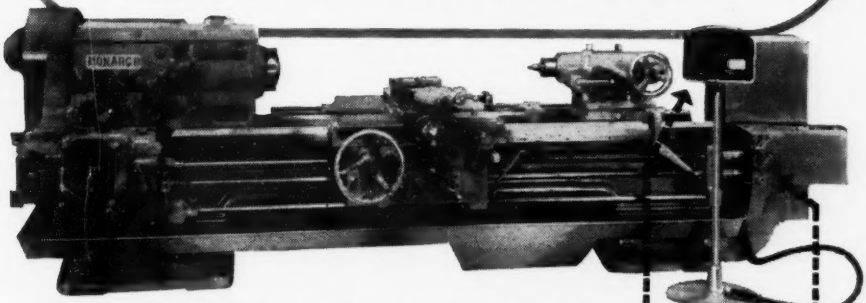
The E. HORTON & SON Co.

WINDSOR LOCKS • CONNECTICUT

HORTON Since 1851 CHUCKS

Announcing—

ANOTHER OUTSTANDING MONARCH TRACER CONTROLLED LATHE



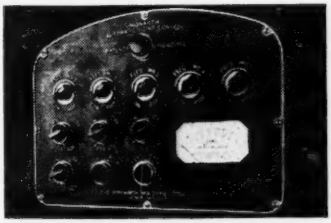
THE MONARCH "MOTOR-TRACE"

For fast, repetitive shaft turning at its economical best you need the new Monarch "Motor-Trace"—an automatic cycle, electric motor operated, electric tracer controlled duplicating attachment available on any standard Monarch lathe, 14" or larger.

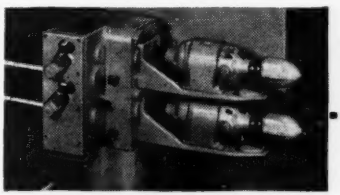
Tracing is done either from gage blocks, micrometer heads or a template. This readily adapts it to straight, multiple diameter shaft work in any desired size within the capacity of the machine. Unbeatable on long production runs, it also is recommended for its ability to cut costs on exceedingly small lots, because of the simplicity of micrometer head setup.

As the completely automatic cycle is finger-tip controlled from a single pedestal-type station, one man can operate two machines, *easily*. An equally important economy feature is the ability of the "Motor-Trace" to be disengaged in less than thirty seconds, allowing quick conversion to conventional engine lathe operation.

You'll want to investigate how these features and others fit the "Motor-Trace" for "*peak production at a profit*" in your shop. Be sure to ask for complete information.

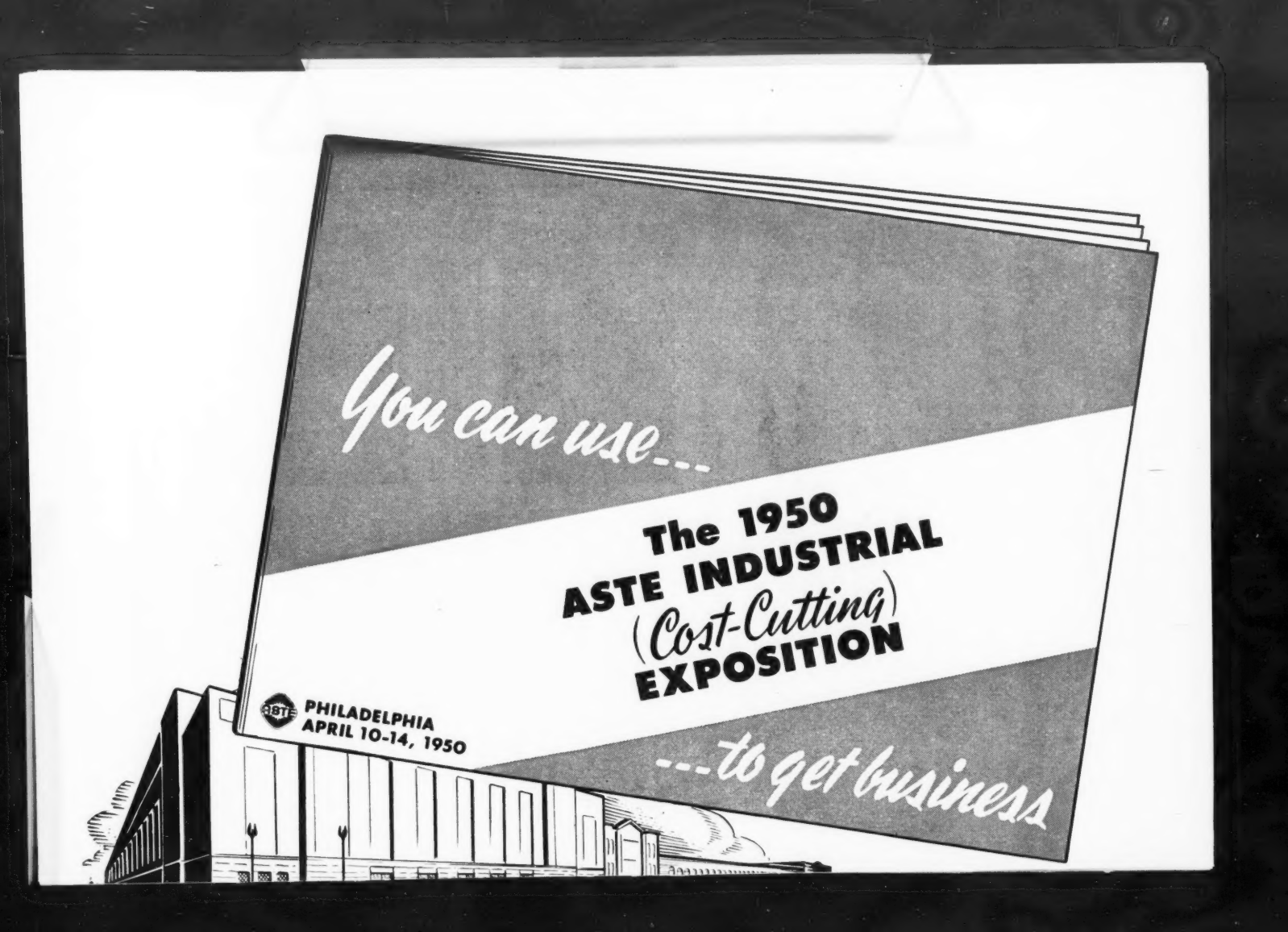


This pedestal-type control stand, permits complete control of the fully automatic cycle from a single point. For maximum machining efficiency, as many as five different feeds may be preselected.



"Motor-Trace" driving motors (with cover removed), electronically controlled, take the responsibility for feed change and fast carriage return out of the operator's hands.

THE MONARCH MACHINE TOOL COMPANY • • • Sidney, Ohio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EXPOSITION
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The ASTE can help you for the simple reason, first of all, that its 18,000 members comprise those men **whose job it is to find new methods and equipment that will cut their companies' costs.**

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Who are these tool engineers? A breakdown of registrations at the last ASTE Exposition shows that they hold the following positions in their companies:

President, Owner or Partner	**13½%**
Top Management Executives	**17 %**
Production Executives	**25 %**
Master Mechanics; Process, Methods & Production Engineers, Etc.	**26 %**
Chief Engineers, Development Engineers, Etc.	**18½%**
TOOL ENGINEERS	**100%**

The booklet will tell you how many thousands of each there were . . . what kind of companies they represented . . . where they came from . . . what kind of products they came to see and buy.

And it tells you why EVEN MORE OF THE MEN WHO SPECIFY AND BUY will be at Philadelphia's Convention Hall & Commercial Museum next April 10th to 14th, looking for things that will cut their costs.

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setup
SAVE TIME WITH...
DANLY Kwik Klamps
Danly "Kwik Klamps" are shown here in use for clamping metal window casement members in place for welding.

Positive clamping action in any hold-down application with only a single, quick lever motion!

These quick acting, positive toggle clamps cut set up time to a minimum . . . conserving costly productive hours for actual production work. Clamping pressure is positive and controlled. Work pieces are locked securely in place for welding, machining or any other fabricating operation with a quick thrust of the handle.

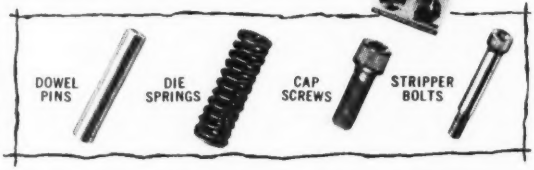
A range of twenty-six sizes with clamping pressure ratings up to 750 pounds is available to suit almost every application.

Design variations in both handles and bases make them ideal for inclusion in permanent fixtures. Write for complete specifications and application data—today!

SEND FOR THIS BOOKLET

...and see how DANLY "Kwik Klamps" will reduce your set up costs!

DANLY



Danly Machine Specialties, Inc. 2100 South 52nd Avenue, Chicago 50, Illinois

PRECISION DIE SETS...TOOL, DIE AND GAGE MAKERS' SUPPLIES

2 VITAL JOBS DONE with 1 COMPACT UNIT

Norgren Vitalizer No. 0-508-2

Automatically

1. **Prevents abrasive dirt and corrosive moisture in air line from entering air-powered tools and equipment.**
2. **Thoroughly lubricates all moving parts of air equipment by means of a fine air-oil fog.**

FILTER removes moisture by centrifugal force; holds it in quiet zone beneath baffle until drained. Reinforced, 200 mesh, Monel wire screen stops dirt, pipe scale, etc.

LUBRICATOR injects correct amount of oil into air stream—creates an air-oil fog. Visible oil feed permits regulation to suit any application. Lubricates only when air equipment operates. Nothing to turn on or off. Air equipment wear is reduced, corrosion is stopped.

Simply install in your air line as close as possible to the air-powered tool or equipment. Straight through pipe connections.

Write C. A. Norgren Co., 222 Santa Fe, Denver 9, Colo.

Norgren

- **LUBRICATORS**
- **FILTERS**
- **REGULATORS**
- **VALVES**
- **HOSE ASSEMBLIES**

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MOTOR PROBLEMS ARE SOLVED BEST BY

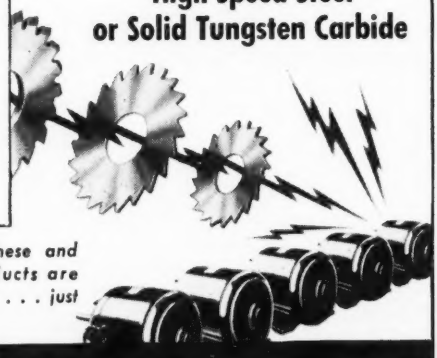
CIRCLE (R) SAWS

FOR COMMUTATOR SLOTTING and Mica Undercutting

"U" and "V" Type High Speed Steel or Solid Tungsten Carbide

That's right . . . today wherever electric motors for land, air or sea power are made, you'll find CIRCLE R saws at work!

These CIRCLE R Saws are clearance ground to prevent binding.



Complete listings of these and other CIRCLE R products are available in catalog M . . . just issued!

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Another reason why Bay State taps produce so many holes, and still cut close to size.

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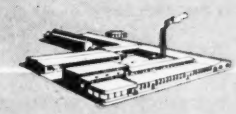

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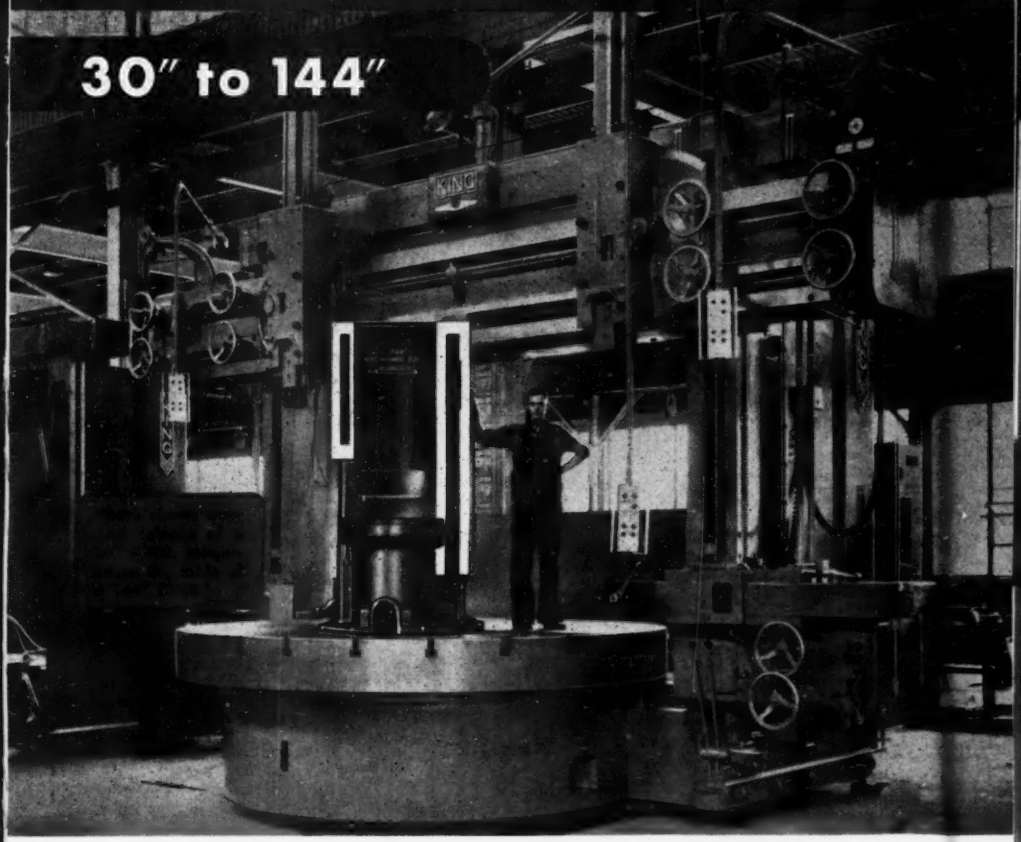
KING Makes the Widest Range



The KING line of Vertical Boring and Turning Machines is not just a "large size" or a "small size" line. It's an all size line. KING and *only* KING "covers the field", with 10 sizes: 30" and 36", one head on rail—42", 52", 62", 72", 84", 100", 120", and 144", one or two heads on rail. All sizes are available in a variety of head combinations, with or without side head.

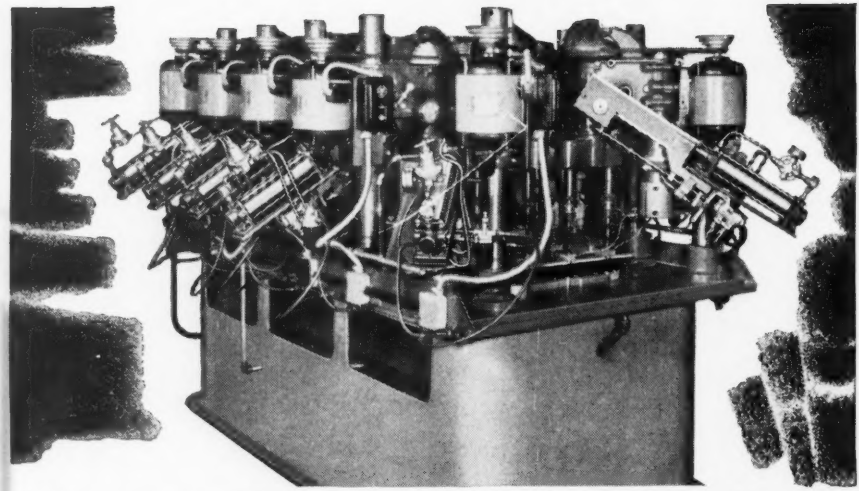
KING has the size range—and KING has the extra weight and rigidity, the speeds, the power, the time-saving ease of control that adds up to *more work and better work at less cost.* Get the facts. Write today for catalog giving detailed information. Specify the size machines that meet your job requirements.

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO

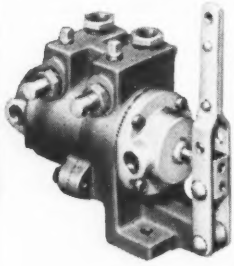
Builders of Vertical Boring & Turning Machines and Sebastian Lathes



12 Spindles of Automatic Drilling Machine are NOPAK Operated

NOPAK *Reciprotrol* 4-Way Valves automatically control Speed-and-Length-of-Stroke of Reciprocating Cylinders.

12 NOPAK Reciprotrol Valves Actuate 12 NOPAK Cylinders



Twenty-four 5/8" holes are drilled every 15 seconds by this high production machine, specially built for the U. S. Government by Dorr Sales Co., Milwaukee, Wis. Feeding and retraction of the 12 drill press spindles is fully automatic once the master control valve (a NOPAK 3/8" 4-way operating valve) is opened.

The master valve trips twelve 3/8" NOPAK Reciprotrol Valves which actuate 12 NOPAK 3" x 10" Model "A" Cylinders. Each cylinder "feeds" one of the 12 large, double-spindle, drill-press heads, retracting the spindle after the hole is drilled. The 12 cylinders operate automatically at a pre-determined stroke speed, governed by the Reciprotrol Valves, and depending upon the size of hole and thickness of metal to be drilled.

Write for Special Bulletin on NOPAK Reciprotrol Valves.

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VALVES AND CYLINDERS
DESIGNED for AIR and HYDRAULIC SERVICE

A 5649-½I

speed doesn't sag under load

Because they work at full speed under all loads, CP Super Cycle Grinders remove more metal at less cost than other grinders. With the lowest ratio of weight to horsepower ever built into a portable tool, they are easier to handle . . . more quickly located on work . . . less tiring to hold.

Maintenance is outstandingly low. There are no brushes to replace, no armatures to burn out, because the motor—operating on 360 cycle, 3-phase, 220 volt current—is of squirrel cage induction type.

CP Supercycle Grinders and Sanders are available in straight and angle models, with elastic bonded or vitrified wheels, wire brushes and cup wheels.

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General Offices: 8 East 44th Street, New York 17, N. Y.

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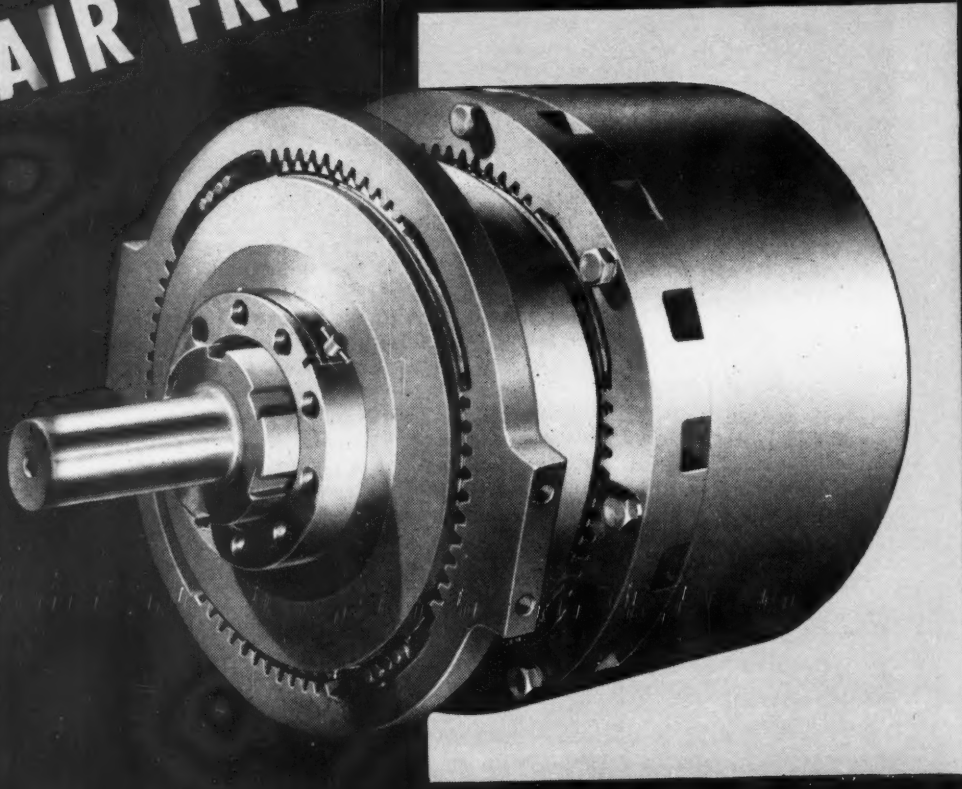
NIAGARA

AIR FRICTION CLUTCH



NIAGARA MACHINE AND TOOL WORKS, BUFFALO 11, N. Y.

is Another Reason for satisfaction with NIAGARA *single and double Crank Presses*

● On single stroking operations where the going is tough, Niagara Air Friction Clutches have met every test of time and service.

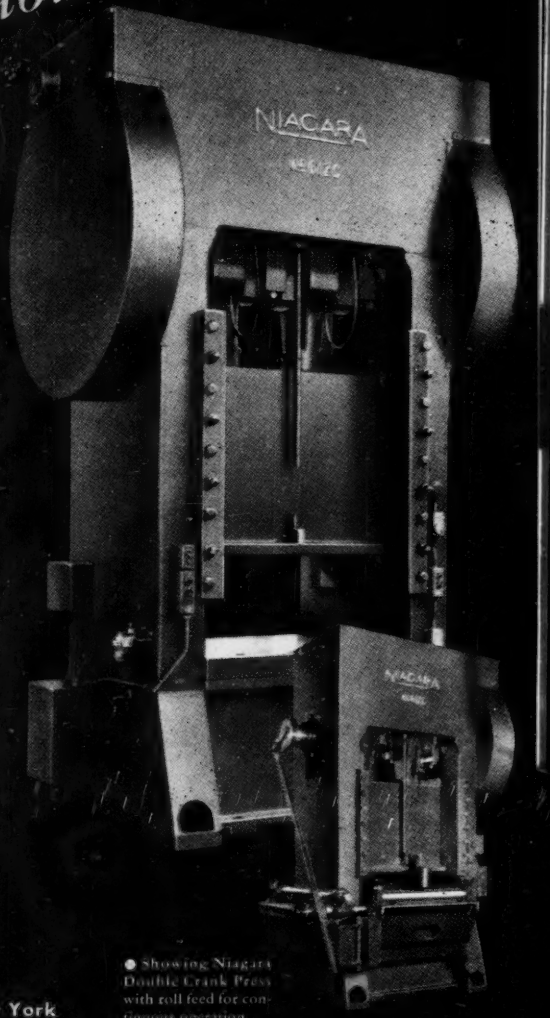
Safe, effortless push button control contributes to maximum hourly output. Controls can be arranged in various ways to suit all operating conditions. Clutch and brake action is instantaneous, smooth and quiet. There can be no overlapping of clutch and brake action. Extra locking palm buttons can be supplied for additional operators.

Pressure on all buttons not locked out of the circuit is required to release the brake and engage the clutch. Release of any one button on the down stroke disengages the clutch and applies the brake causing the press to come to an immediate stop.

Slide can be inched for adjusting dies.

Flywheel mounted on anti-friction bearings. Clutch maintenance is cut to a minimum.

Photographs at right show modern Niagara Double Crank Presses. They are available in a wide range of sizes and capacities.



● Showing Niagara Double Crank Press with roll feed for continuous operation.

District Offices: **Detroit, Cleveland, New York**

HIGHER PRODUCTION? *Yes!*

LOWER COSTS? *Yes!* — and ACCURACY BESIDES

with the MOTCH & MERRYWEATHER NO. 2-A CIRCULAR SAWING MACHINE

Triple-Chip Method

Triple-Chip Method cut off 490 pieces in 50 seconds per cut at a cost of $.0101 per piece.

TRIPLE-CHIP vs. ALTERNATE METHOD

(Sawing SAE 1020 5" O. D.)

Alternate method cut off 100 pieces in 235 seconds per cut at a cost of $.0325 per piece.

As with all Motch & Merryweather Circular Sawing Machines, the No. 2-A (automatic) brings you all the advantages of the Triple-Chip Method. Stock up to 6" is sawed accurately to length without burrs, giving a mill-type finish, which eliminates second operations. Work is held rigidly on both sides of the blade. With the M. & M. Triple-Chip Saw Blade, correctly sharpened by the No. 1 Automatic Grinder, maximum cut-off speed and accuracy are attained. *Ask us to furnish you with cutting time figures.*

★ ★ ★

The M. & M. No. 2-A Circular Sawing Machine has automatic, micrometer adjustable-stop bar feed to 36". Additional stroke lengths and conveyor can be furnished to accommodate long length bars.

• • •

A complete range of circular sawing machines is available for stock up to 16½" round as well as special machines to meet your requirements.

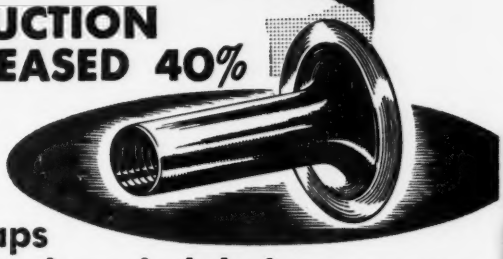
Write on your letterhead for Bulletin No. 2-D.

THE MOTCH & MERRYWEATHER MACHINERY CO.
PENTON BUILDING • CLEVELAND 13, OHIO

AT YOUR COMMAND • AN UNPARALLELED EXPERIENCE IN CIRCULAR SAWING

HERE'S HOW...

PRODUCTION WAS INCREASED 40%



costly lab treated taps produced 15,000 threaded holes per tap

HY-PRO ENGINEERING cut tap costs and increased production to 21,000

PART: Pressed steel tubular nut.

PROBLEM: A leading special products manufacturer was tapping with a 5/16 – 18 spiral point tap to a depth of 3/4" full thread in tough, stringy steel. To average 15,000 holes per tap, many required lapping to size and all were specially surface treated. A costly, time-consuming process for the user.

Then they called in a Hy-Pro Engineer.

HY-PRO SOLUTION: He recommended a Hy-Pro quality controlled 5/16 – 18 spiral point tap with an exclusive Hy-Pro surface treatment that provides longer wear and proper lubrication. Production now consistently runs 21,000 threaded holes per Hy-Pro tap — *and* they are used without modification.

Above is a typical example of how the Hy-Pro Sales Engineer can help increase threaded-hole production. His expert engineering counsel backed by the most up-to-date tap production methods combine to solve tapping problems rapidly and profitably.

Let Hy-Pro solve your tapping problem — call a Hy-Pro Sales Engineer today.

Order from your Distributor

REG. U.S. PAT. OFF.

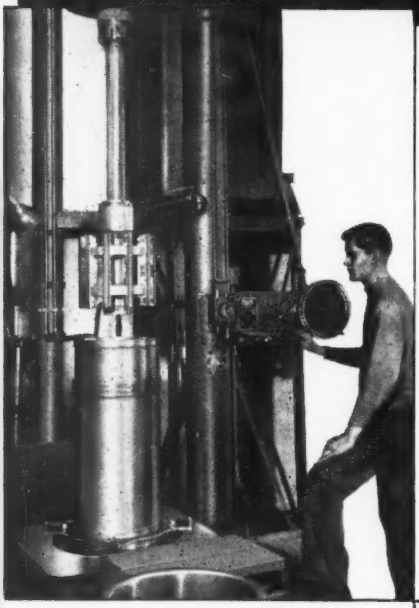
HY-PRO TAPS

HY-PRO TOOL CO.

NEW BEDFORD, MASSACHUSETTS

A SUBSIDIARY OF CONTINENTAL SCREW COMPANY

YOU CAN'T BEAT FULMER HONING



Fulmer Model 15-48 honing 12½"x42" Diesel liner. .012"-.015" of Gun Iron is removed in 10-12 min. Machine capacity: 2"-15" diam.

● ***THE FASTEST,*** *most efficient* and easiest method of finishing cylindrical bores ½" to 30" diam.

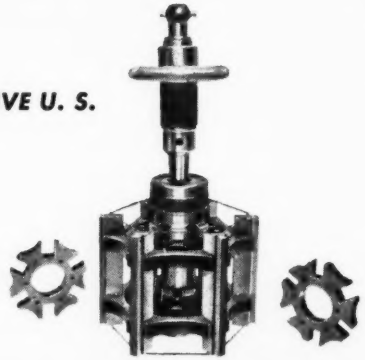
● ***FAST STOCK REMOVAL:*** It is the common practice for stocks of .015"-.060" to be removed in a fraction of the time required to set up the job for boring.

● ***EXTREME ACCURACY:*** Hold to ±.0001" tolerance on bore size, straightness, roundness, with any surface finish desired.

● ***ENGINEERED*** to give *maximum* production with *minimum* investment, Fulmer Honing Machines offer the *greatest value* in the honing field. Get full details today.

FULMER COMPANY NOW EXCLUSIVE U. S. DISTRIBUTOR FOR ALEXANDER BALL HONING TOOLS

Available in sizes from ½" to 50" diam.



● WRITE FOR NEW 12 PAGE HONING BULLETIN.

Fully illustrated. Gives valuable data on honing applications, Alexander Ball Honing Tools, and specifications on all models of Fulmer Honing Machines.

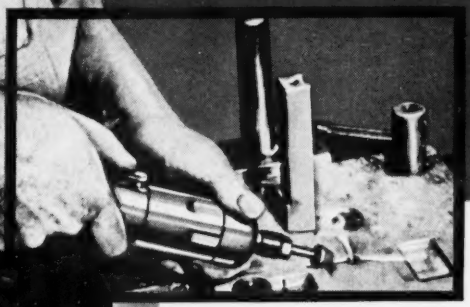
C. ALLEN FULMER CO., 1233 First National Bank Bldg., Cincinnati 2, Ohio

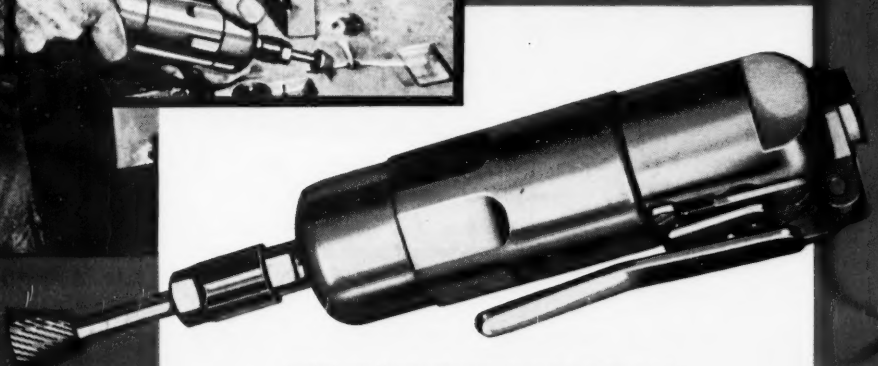
Rotary-type motor means Power . . . Easy Handling . . . Lower Grinding Costs . . . Use

SKIL Pneumatic Tools

Exclusive rotary design, better construction, better performance make SKIL Pneumatic Grinder your best bet for high-speed production on a hundred jobs. It's powerful, fast (speed 21,000 r.p.m.) yet lightweight . . . only 1½ pounds. Rotary motor design eliminates end plates which wear and waste air and are costly to replace. This exclusive design gives you more power, tool Can be used for high-speed drilling. SKIL Pneumatic Grinders maintain speed under load . . . stand up better under heavy use . . . save you money on the long run.

You can use them successfully on lead holes, internal grinding, removing casting fins, pattern cutting or on plastics. SKIL Pneumatic Grinder is only one of the complete line of SKIL Pneumatic Tools. Read the list at the left and call your SKIL Tool Distributor today for a demonstration.





Available with ⅛ inch collet and Jacobs chuck for drilling. A tool post holder is also available for use in a lathe.

OTHER SKIL Pneumatic Tools for fast work include:

SKIL Drills
SKIL Drivers
SKIL Runners
SKIL Grinders
SKIL Hammers

. . . with a complete line of accessories.

SKIL ELECTRIC Tools PNEUMATIC TRADEMARK

THESE TOOLS ARE MADE ONLY BY
SKILSAW, INC.
3033 Elston Ave., Chicago 18, Ill.
Factory Branches in Principal Cities
In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.

MAKES IT EASIER TO RADIALLY RELIEVE CUTTING TOOLS

★ **You, too, can take advantage of the faster, cleaner cutting ability and longer life of radially relieved tools.**

D-S has simplified the job. Any good grinder hand can produce this relief actually faster than regular angular back-off on taps, step drills, counterbores, profile mills, gear tooth rounding cutters, etc., of 1 to 14 flutes, with or without centers.

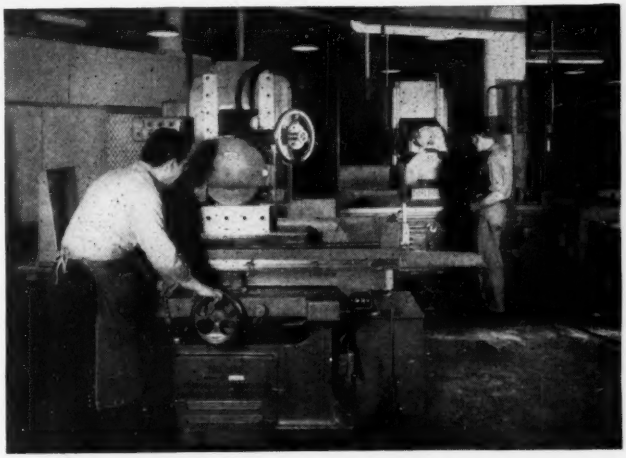
WRITE FOR OUR CATALOG ON TOOL GRINDING FIXTURES

D-S GRINDER DIVISION

ROYAL OAK TOOL & MACHINE CO.

621 E. 4th St. • Royal Oak, Mich.

Enthusiastic Customers do our BEST advertising



The Rotor Tool Company, Cleveland, Ohio, uses a Model F Grand Rapids Hydraulic Feed Surface Grinder and a Model 55. They call their purchase of these machines an "excellent investment."

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. **One-piece column and base casting for vibrationless rigidity**
2. **Precision ball-bearing spindle which is greased for life**
3. **Bijur one-shot lubrication system eliminating hand oiling**
4. **Patented vertical movement of wheel head for quick, accurate adjustments**
5. **Portable coolant tank for ease of coolant replacement**
6. **Vane type hydraulic pump for fast longitudinal table travel**

to serve you—

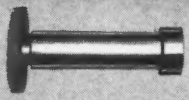
Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GALLMEYER & LIVINGSTON
COMPANY

308 Straight, S. W., Grand Rapids 4, Mich.

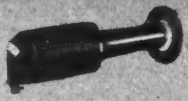
GRAND RAPIDS GRINDERS

WHICH ONE? *NAME YOUR SPINDLE*



P-1

8" dia. wheel; housing dia. 3¼", over-all length 15⅜", max. speed 6000 RPM.

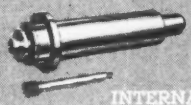


P-32T

Direct Motorized Cartridge Type Grinder Spindle.

P-2500

from ¾ to 20 HP. Ask for Catalog 58.

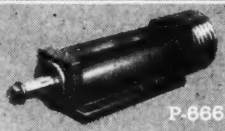


INTERNAL

Internal Grinding Spindle for every requirement. Ask for new Catalog 57.

P-274

New belt driven Spindle for No. 2 Cincinnati Cutter Grinder.



P-666

Heavy Duty Wheel Head Spindle; over-all length 25⅜"; center height 3"; foot type housing 18¾" long x 8¾" wide; max. speed 4000 RPM.

P-693

High cycle, 16,600 RPM, totally enclosed fan cooled 1 HP motorized spindle, over-all length 18⅜", barrel dia. 3".

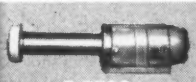
POPE

TRADE MARK REG. U.S. PAT. OFF

builds into these Spindles the precision performance and long life that results in better work and more of it. Get the facts and figures on the one best Spindle for your job.

P-531

Boring Machine Spindle for Diamond or Carbide Tools; over-all length 20", center height 3", base 14⅝" x 8"; max. speed 5000 RPM.



P-5793

3, 5 or 10 HP, heavy duty deep hole grinding Spindle; 1800 or 3600 RPM; barrel dia. and length to specifications.

SPECIAL SPINDLES - *YOU* NAME IT

Send us your specifications for a quotation.

Check and Mail This Coupon

Pope Machinery Corporation
261 River St., Haverhill, Mass.

Gentlemen

Please send descriptive literature, specifications and estimates on the Pope Spindle types checked: P-1..... P-32T..... P-2500.....
INTERNAL..... P-274..... P-666..... P-693..... P-531..... P-5793.....
Special Spindles for .....

NAME .....
POSITION .....
COMPANY .....

No. 62

New!

New!

New!

Speed big hole cutting in any machinable material with the new, Welded-Edge BLU-MOL® Hole Saws

Here's a new time and money saving line of tools that are already proving their value in plant after plant. They're the gang-cutting, follow-through type Blu-Mol Hole Saws.

With specially selected High Speed Edge welded to a super tough alloy back, they easily handle any machinable material from wood to hard steel. They cut holes through solid stock up to 1⅛" thick. They can also be used on stacked material of lesser thickness or for cutting through successive partitions. And they do it faster, cheaper, more efficiently than possible by other methods.

Available in ⅛" steps from ⅝" to 4½", the new Blu-Mol Hole Saws can be driven by any portable power tool, radial drill, lathe or drill press with ½" or larger chuck.

Write today for a FREE DEMONSTRATION of these high performance tools that are already effecting tremendous savings for many companies.

MILLERS FALLS COMPANY

MILLERS FALLS TOOLS SINCE 1868

GREENFIELD, MASSACHUSETTS

Extend the scope of lower-cost, up-to-date production . . . . with the

Bridgeport

1 H.P. MILLING, DRILLING AND BORING ATTACHMENT

A NEW UNIT FOR HEAVY DUTY NEEDS

With the advent of this NEW "BRIDGEPORT" attachment, die, tool, mold and metal working shops of all kinds can modernize the handling of heavier work.

All the advantages in milling, drilling and boring the "Bridgeport Way," as demonstrated in the more than 11,000 universally popular standard Milling Attachments now in service, are made available in this heavy duty unit. Capacity, speed and convenience make past methods obsolete and assure higher production at lower cost.

Here are a few of the reasons for the outstanding performance of this NEW attachment:

- **. . . eight spindle speeds, from 80 to 2720 RPM are provided**
- **. . . spindle drive unit is back geared and designed to utilize full horsepower at all speeds without belt slippage**
- **. . . quill travel: 5″**
- **. . . three steps of power feed to quill: .0015 - .003 - .006 inch per spindle revolution**
- **. . . positive 2-way power feed stop tripping mechanism**
- **. . . convenient changing of tools provided by spindle brake and lock**
- **. . . collet capacity up to ¾″ diameter.**

Further and complete details available promptly on request.

Equipment Available for this NEW UNIT

Holders for shell mills

Fly cutting heads

No. 2 "Bridgeport" Boring Head

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

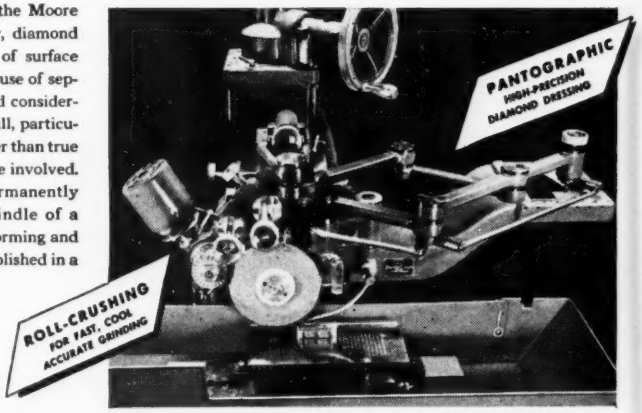
Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Now you can combine roll-crushing and diamond dressing in a single wheel dresser to speed form grinding

Before the development of the Moore Panto-Crush Wheel Dresser, diamond dressing and crush-forming of surface grinder wheels called for the use of separate devices. These required considerable set-up and operating skill, particularly where odd contours other than true radii and straight surfaces are involved.

Now with the Moore, permanently mounted on the wheel spindle of a surface grinder, both crush-forming and diamond-dressing are accomplished in a single mechanism.

Here's how this 2-in-1 machine does it:



1. Combines Pantograph, working directly from template, and *Roll-Crushing* in one device, accurately related to spindle.

2. Switches from one method to the other without disturbing workpiece setting or location of either trueing device.

3. No setting up of complex attachments each time wheel is dressed . . . no raising of wheel spindle from work to dress, yet wheel spindle may be raised or lowered without losing relation of wheel form to dressing device . . . crusher method saves diamond costs.

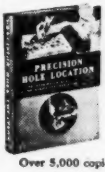
4. Assures highest roll-crushing accuracy and economy. Crusher roll is *ground* and *used* on same spindle, without disturbing position . . . no expensive machine required to grind crusher roll . . . no worry about hardening distortion, because roll is ground *in place* from the solid directly from template.

5. Takes Skill out of job, yet adds advantage of crush dressing for heavy cuts without heating work, and ultra-precision diamond dressing.

6. Device need not be removed to use machine as conventional surface grinder.

Both MACHINE DESIGN and MACHINERY magazines devoted considerable editorial space to technical discussions of the value of this ingenious new mechanism. We'll be glad to send you reprints and a descriptive catalogue on Panto-Crush.

MOORE SPECIAL TOOL CO., Inc.
730 UNION AVENUE, BRIDGEPORT 7, CONN.



HAVE YOU BOUGHT YOUR COPY OF "PRECISION HOLE LOCATION"?

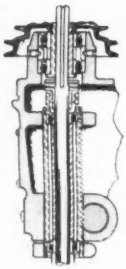
Over 5,000 copies of this valuable book on toolmaking practices have been sold to date. Available at special price of $3 in U. S. A.; $3.50 outside U. S. A. 448 pages, over 400 illustrations. 184 pages of Woodworth Coordinate Location Tables from 3 to 100 holes. Send check or money order to Moore Special Tool Co., Inc., Bridgeport 7, Conn.

Add a MOORE to YOUR TOOLROOM

JIG BORERS · JIG GRINDERS · PANTO-CRUSH WHEEL DRESSERS
DIE FLIPPERS · COMPLETE LINE OF HOLE LOCATION ACCESSORIES

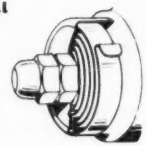
FOUR PRECISION BALL BEARINGS

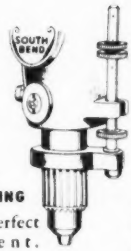
Two on spindle, two on drive sleeve. Pre-lubricated and sealed precision type, no oiling required.



ADJUSTABLE QUILL RETURN SPRING

Retracts quill instantly upon release of feed lever. Tension of spring adjustable.



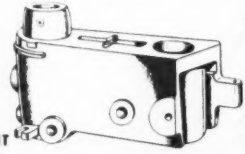


DEPTH GAUGE

Controls feed depth, length of return stroke, or locks spindle in any position. 16th graduations.

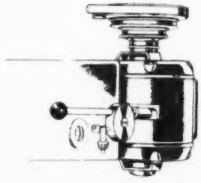
ONE-PIECE HEAD CASTING

Insures perfect alignment. Double-plug binder locks the head to column. Column bearing is NOT split.



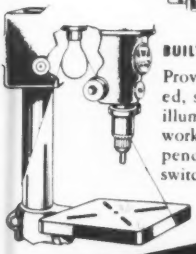
BELT TENSION RELEASE

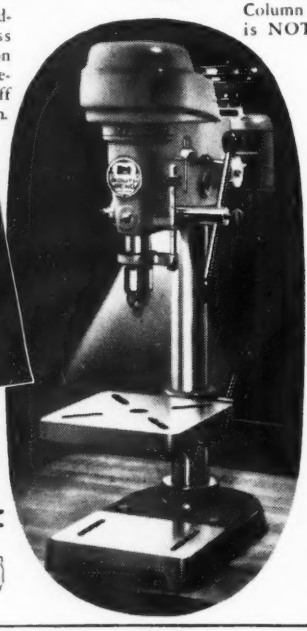
Flip of lever removes tension from belt for easy speed changes. Proper belt tension maintained.



BUILT-IN LIGHT

Provides shielded, shadowless illumination on work area. Independent on-off switch is built-in.

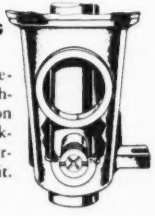




NEW! SOUTH BEND 14" Drill Press

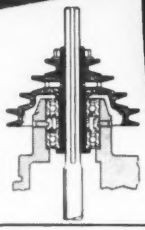
QUILL BEARING ADJUSTMENT

Shoe-type take-up provides feather-touch tension and secure locking. Quill bearing is NOT split.



FREE-FLOATING SPINDLE

Design prevents misalignment, side thrust and whip. Precision splines in spindle and sleeve.



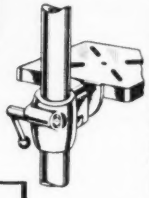


TABLE LOCK

Double-plug binder securely locks table to column. Eliminates misalignment. Column bearing is NOT split.

CAPACITIES — SPECIFICATIONS

CAPACITY
Maximum drill size in iron or steel—½". Drills to center of 14¾" circle

CHUCK
Capacity—0 to ½"

SPINDLE
Regular drill chuck type supplied.
Travel . . . . . 4"

CHUCK TO BASE DISTANCE
Bench Model—17"
Floor Model—46½"

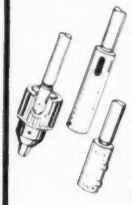
SPINDLE SPEEDS
Four—655 to 4530 r.p.m.

TABLE SIZE
10" x 10". Tilts to any angle.

Bench Model $129.30

Floor Model $144.30

Prices, f.o.b. factory, include drill chuck and 1/3 h.p., 115 or 230 v., 1 ph., 60 cycle motor and switch.



INTERCHANGEABLE SPINDLES

Spindles available to take No. 2 Morse taper shank tools, and for 1/2" straight shank tools, router bits, shaper cutters, etc.

SOUTH BEND LATHE WORKS

BUILDING BETTER TOOLS SINCE 1906 • 427 E. MADISON ST., SOUTH BEND 22, IND.

Sixth in a series of
Unusual Grinding
Wheel Operations

GRINDING WHEEL MEETS COCOA BEAN!

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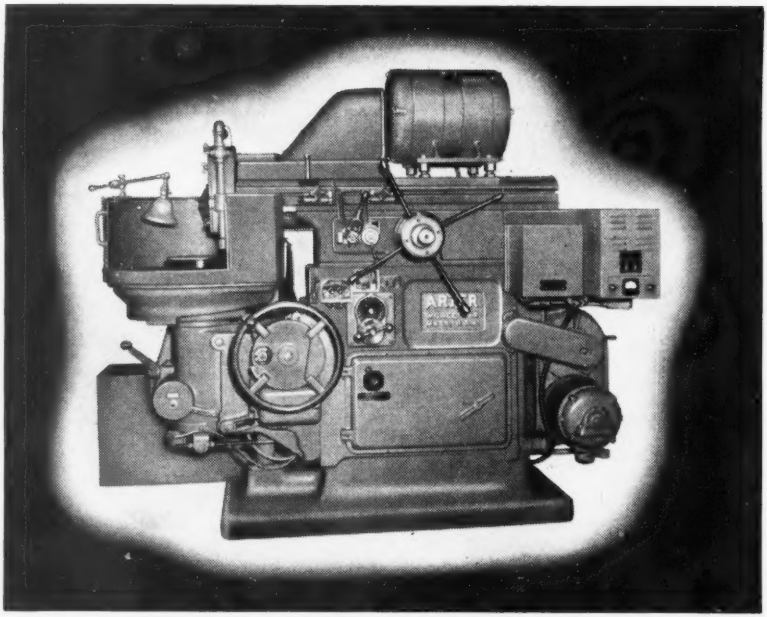

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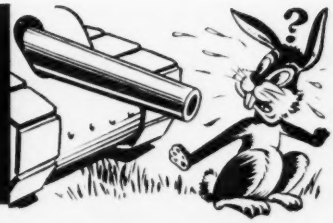

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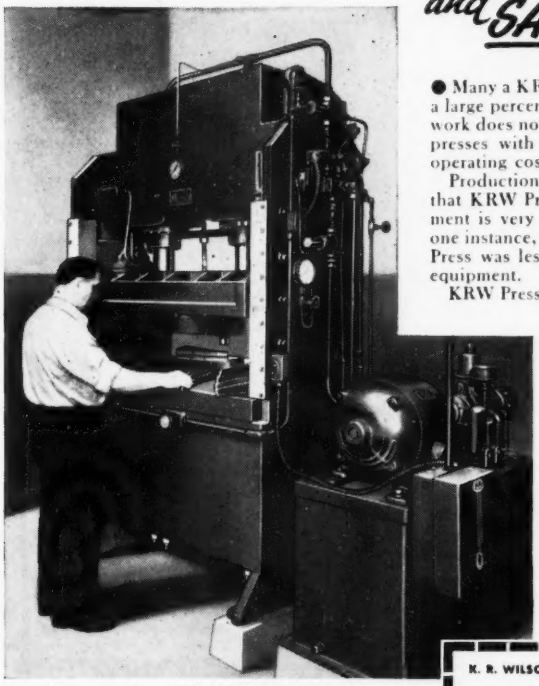

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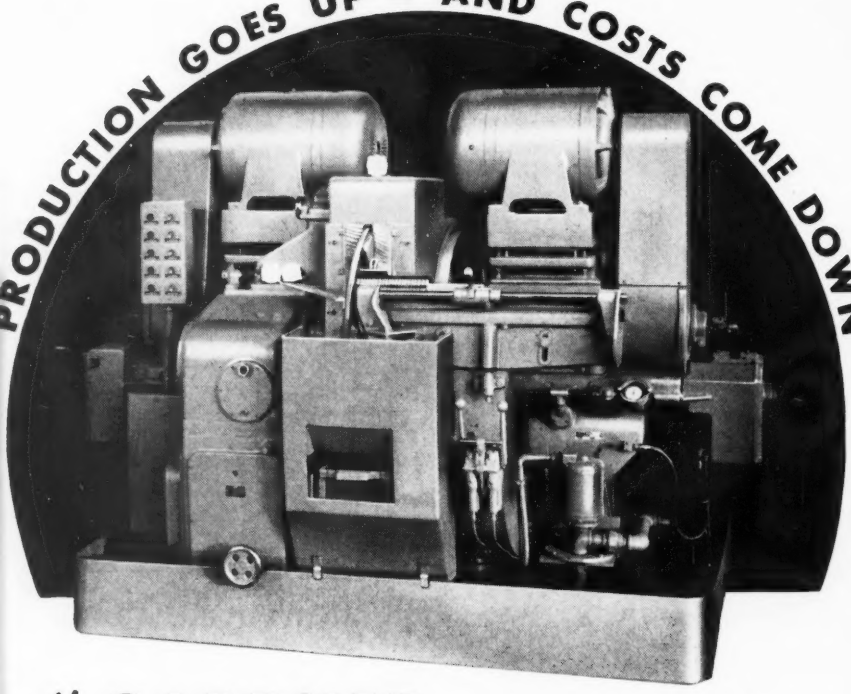

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WORK DATA

Part *Pump Cover*
Material *Cast Iron*
Operation *Grind Two Sides*
Tolerances *.0005"-.001" for Flatness; .001" to .0015" for Parallelism; .010 for Uniformity*
Stock Removal *.040" to .050" Maximum Overall*
Production *12 to 15 Pieces per Minute*
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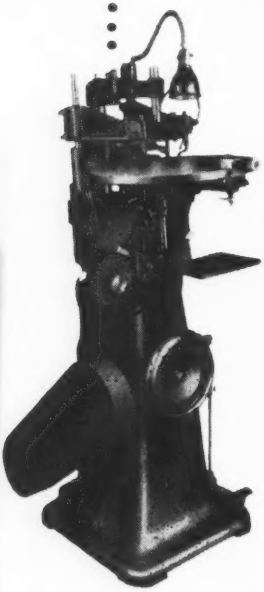

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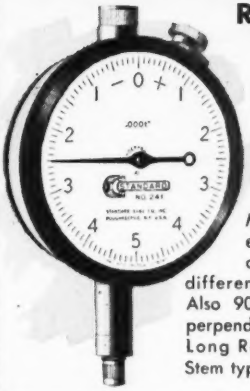

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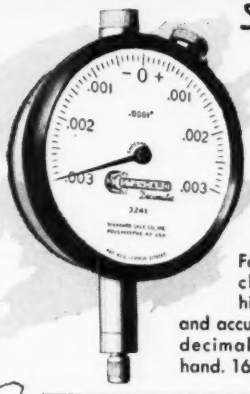

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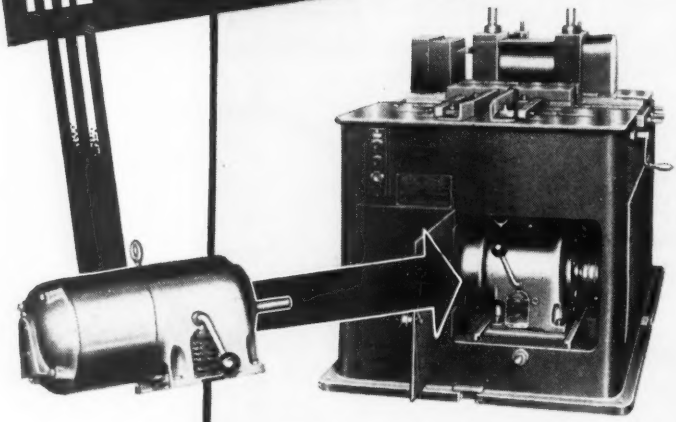

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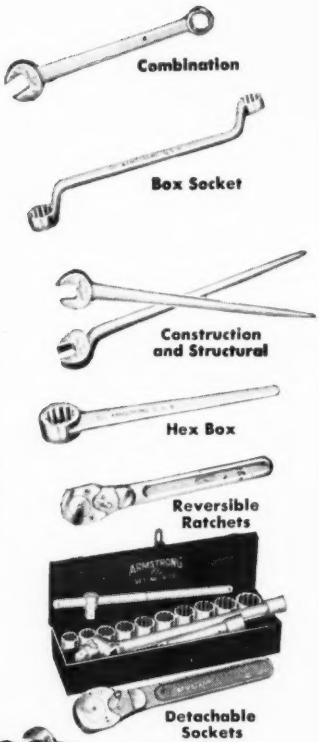

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MODERN
Machine Shop

DECEMBER, 1949 • Vol. 22, No. 7

FEATURES IN THIS ISSUE

Powder Metallurgy—A Challenge *By R. L. Ziegfeld and K. H. Roll*

Authors Ziegfeld and Roll present some timely data on the latest developments in powder metallurgy. Of particular interest is the description of the process as applied to the manufacture of products which are practically impossible to manufacture by any other means. Page 72.

Cutlery Plant Profits from Visual Efficiency Program *By Arthur J. K. Delage, Jr.*

As an aid in maintaining high worker efficiency, Russell Harrington Cutlery Company has adopted a thoroughly sound eye care program. In describing the program, Mr. Delage tells why it came into being, how it operates, and what the results have been since the program was set up. Page 92.

An Analysis of Shaving and Burnishing Dies *By C. W. Hinman*

In this article Mr. Hinman describes a method for automatically centralizing irregularly shaped castings and forgings and also dies for progressively blanking, shaving, and burnishing. Page 104.

A Little Play Paves the Way *By Gilbert C. Close*

Mr. Close tells how the Douglas, El Segundo plant conducts a recreational program in which practically all employees participate. Page 124.

Winding That Occasional Spring *By L. Kasper*

A variety of simple methods of winding tension and compression springs forms the basis of this article. Illustrations of several fixtures are included. Page 142.

Sales Hints for the Smaller Shop *By Karl F. Kirchhofer*

The author describes the benefits to be derived from contacting competent advertising agencies for help in the solution of marketing problems. Page 154.

Induction Hardening, Part III *By Frank W. Curtis*

Mr. Curtis concludes his present series of articles with a description of miscellaneous applications and techniques which are frequently used in selective hardening. Page 166.

By ROBERT L. ZIEGFELD
Acting Secretary, Metal Powder Association, and
KEMPTON H. ROLL
Secretary, Standards Committee, Metal Powder Association

POWDER metallurgy is a term which is heard more and more these days. But while it is a new term to some people, the process is far from being a new idea. The ancient Egyptians and probably men of other early civilizations discovered methods of making powders of many common metals; but it was necessity rather than desire which led these early workers to produce their massive metal tools, ornaments, and weapons by powder methods. Metallurgists of those times discovered that it was possible to consolidate metal powders into more or less solid compacts by heating the powders up and swaging or forging while hot. This process resulted in finished metals equivalent, for their purposes, to cast metals.

As furnaces were improved and as higher temperatures could be attained, the number of metals prepared from powders decreased. The metals having lower melting points, of course, were the first to be prepared by melting and casting methods. Only the more refractory metals remained on the powder preparation list. In the early 1800's Wollaston perfected a method for the preparation of solid platinum from powders. He pressed moistened, finely divided platinum particles together in a mold and then heated the compact up to about 1800 deg. F. after first drying. The material was then forged while still hot. This method, which is still in use today, gave the first really pure blister-free solid platinum.

Later in the nineteenth century, the

electric lamp industry and the search for a metallic filament provided a stimulus for further study of metal powder processes. This study culminated in the production of the tungsten filament and indicated techniques to be applied in the development of other refractory metals as well as non-wearing electrical contacts and electrodes.

Eventually the fact that porosity could be introduced and controlled in metal powder compacts led to the development of oil-impregnated bearings requiring no external lubrication. These types of bearings are still some of the major products of powder metallurgy.

A later development, and one which has had tremendous industrial significance, was the introduction of cemented carbides and their application to cutting tools, dies, and hard surfaced parts of many types. Essentially, these cemented carbides consist of finely divided tungsten carbide particles bonded together, usually by cobalt.

Today, a great variety of valuable and unique products are made for modern industry by powder metallurgy methods. These products include oil-impregnated bearings, metallic filters, clutch plates and friction devices, structural parts, and numerous other applications.

The Process

The methods employed today for fabricating parts from metal powders are relatively simple. To make a given part, a measured quantity of metal powder of the desired composition (either pure metal powder, or alloy powders, or mixtures of pure metal powders may be used) is first poured into a die of the shape desired; and then pressure, ranging from 40,000 to 100,000 p.s.i., is applied. The pressed shape (briquette or compact) is then ejected from the die and placed in a special controlled-atmosphere furnace which is fired either by gas or electricity. Here, in the case of a single

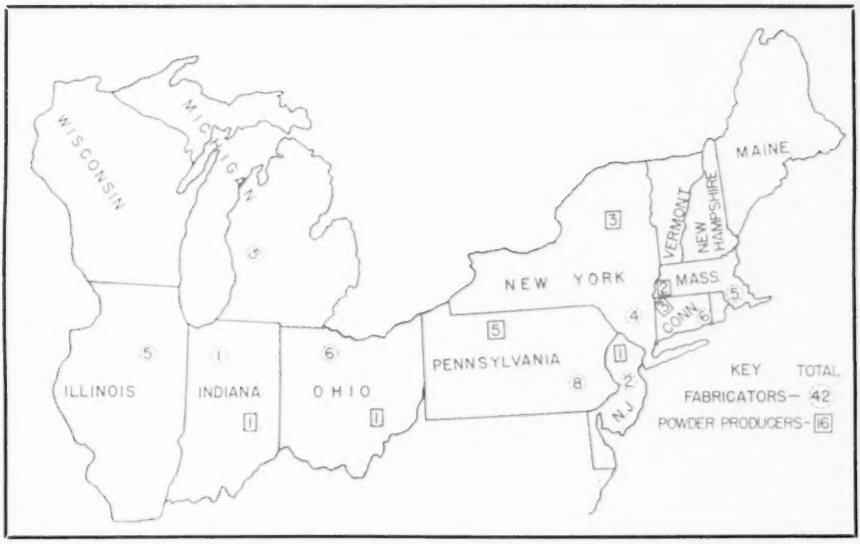


Fig. 1—Geographic distribution of metal powder part fabricators and powder producers.

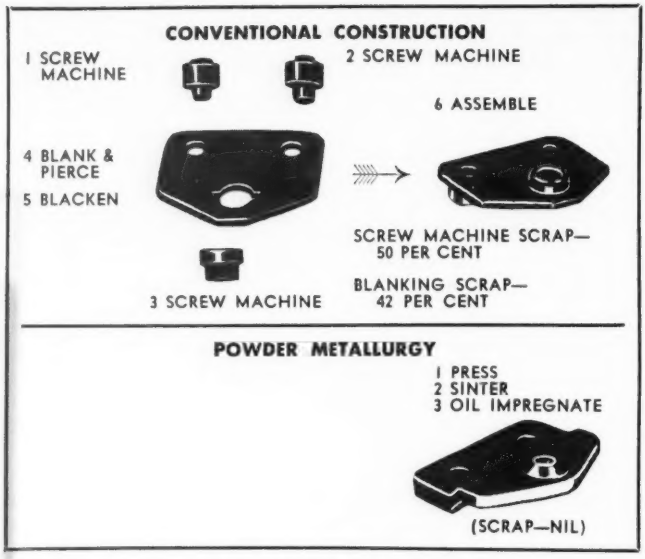


Fig. 2 — Assembled bearing plate (top) for toy trains was replaced by metal powder bearing plate (bottom). *(Illustration courtesy Lionel Corp.)*

metal, the pressed shape is heated to a temperature which is roughly one-third below the melting point of the metal; or, in the case of an alloy mixture, it is heated to a temperature which is just below the melting point of the constituent having the lowest melting point. This heating causes the individual powder particles to be sintered or bonded together and thereby to form a dense homogenous structure. Sintering may cause a reduction in volume of as much as 35 per cent; and for this reason many parts are often re-pressed, or coined, in dies in order to correct any undesired dimensional changes due to non-uniform shrinkage.[2]

Tolerances

In the powder metallurgy method of production, just as in the production of precision parts by any process, dimensional tolerances cannot be overlooked or ignored. Generally speaking, tolerances which can be met in general machine practice can also be met by powder metallurgy methods; but beyond that, closer tolerances for the most part are not commercially feasible

A survey of parts fabricators was conducted recently, and ± 0.005 inch was found to be the generally accepted tolerance for axial dimensions (in the direction of pressing).[3] This tolerance can be met quite easily in production work without using additional coining operations. Some fabricators reported that tolerances of ± 0.002 inch can be held without using extra operations. Radial dimensions may be held to closer tolerances than those in the axial direction, but the tolerances vary considerably depending on part size, die wear, and the like. Reports from various fabricators showed that radial tolerances are generally in the range of from ± 0.001 to ± 0.002 inch.

Closer tolerances than those given above may be obtained at added cost by controlling the compacting and sintering operations more closely and by using additional coining operations. Thus, an axial dimension may be held to within ± 0.001 inch; and a radial dimension, in some cases, may be held to as little as ± 0.0001 inch.

The question of tolerance discrepancies in finished metal powder parts and the variables that influence tolerance control were discussed at some length

during the 1949 annual meeting of the Metal Powder Association.[4]

Post-War Development

During the last war when many metals were scarce and when adequate machining facilities were not available, powder metallurgy came into its own as a means of mass producing small parts quickly, with less manpower than was required for other methods, and with little or no scrap loss of hard-to-get metals. Since then there has been a marked increase in the number of plants which are equipped to produce metal powder parts. Today there are at least 42 fabricators in this country alone. Figure 1 shows the geographic distribution, by states, of these fabricators; and it also shows the distribution of powder producers.

Fabricators may actually be classified into two groups (1) large companies which fabricate their own metal powder parts and use all of the parts which are made, and (2) custom fabricators who are prepared to furnish technical know-how and experience as well as plant and laboratory facilities necessary to produce finished parts for various customers who will use the parts in their products. All of the 42 fabricators indicated in Fig. 1 may be classified in the latter category although some of them do double-duty—supply their own company needs and also custom fabricate for others. Not included among the 42 are fabricators who have extensive in-plant powder metallurgy setups but use all of the parts produced in their own products.

Mushrooming from a relatively obscure technique to a recognized position of industrial importance as a result of a war-stimulated impetus, the development of powder metallurgy has seen steady progress in two directions.

(1) Application to products peculiar to and possible only through powder metallurgy.

Of the many products created by powder metallurgy methods, porous oil-impregnated bearings and cemented carbides are probably the most familiar. It is possible, by varying powder particle size and pressing and sintering conditions, to control to a high degree the nature and extent of porosity in bearings and bushings. Before being put into service, the pores or voids are filled with oil so that continuous lubrication is virtually guaranteed by these tiny reservoirs. Such bearings are usually pressed from mixtures of copper, tin, lead, and graphite powders.

A more recent development in this field is the use of a combination of pow-

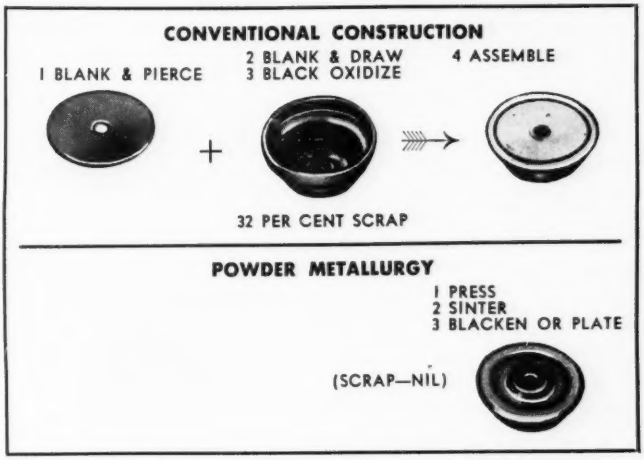


Fig. 3—Use of metal powder car wheel has resulted in reduced costs and improved performance. (*Illustration courtesy Lionel Corp.*)

dered iron and about ten per cent powdered lead. The lead is used to add anti-friction characteristics to the strength of iron. A similar situation involves the combination of powdered copper and about 45 per cent powdered lead.[5] Powder metallurgy is the method applied in these cases because it is virtually the only simple means of combining these metals which differ so greatly in melting points and are therefore difficult if not impossible to combine in the molten state without obtaining severe segregation.

An interesting application which is indicative of the flexibility of the powder metallurgy process may be seen in a bearing plate used in toy trains. The bearing plate, which is shown in Fig. 2, may also be used to illustrate the possibility of replacing an assembled unit with a single compact. In this case, a metal powder oil-retaining bushing, two screw-machined spacers, and a stamped steel plate, which are shown at the top of the illustration, are replaced by a single compacted iron plate possessing a reduced density (porous) bearing as an integral part.

Filters made from metal powders possess unique properties which cannot be matched by filters made by other methods. In addition to being many times stronger than conventional cloth or paper filters, filters made from metal powders may be easily cleaned after use and may be fabricated from a variety of corrosion resistant metals in order to facilitate filtration of corrosives. Another interesting and important characteristic of such filters is their selectivity. For example, in filtering gasoline, any entrained water is removed by the filter along with any solids; on the other hand, in filtering water containing some gasoline and using the same filter as was used in the first case, the water is permitted to pass through but any gasoline is stopped.

(2) Direct competition of the powder process with other mass production processes.

Machining, die casting, stamping, casting, and forging are methods of forming metals with which powder metallurgy may conceivably compete. The following are some reasons why:

(1) Small intricate parts may be made without requiring any additional operations of machining or trimming.

(2) Little or no loss in scrap.

(3) Preliminary operations such as smelting, blanking, piercing, drawing, and assembling may be eliminated.

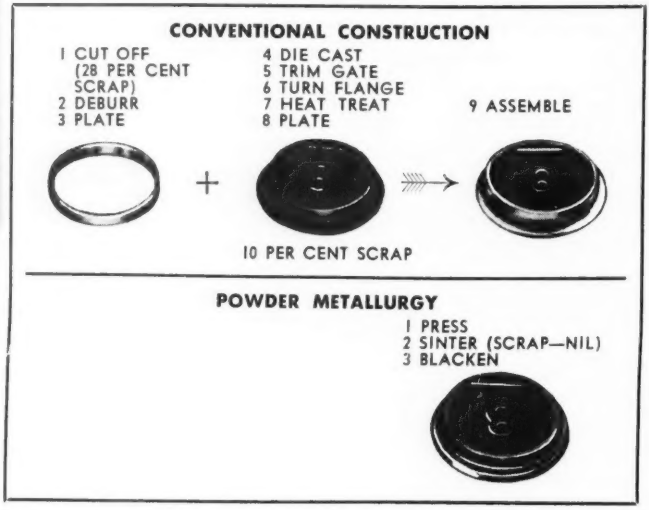


Fig. 4 — Toy locomotive steel tire assembly which formerly required nine operations was replaced by single compact. (*Illustration courtesy Lionel Corp.*)

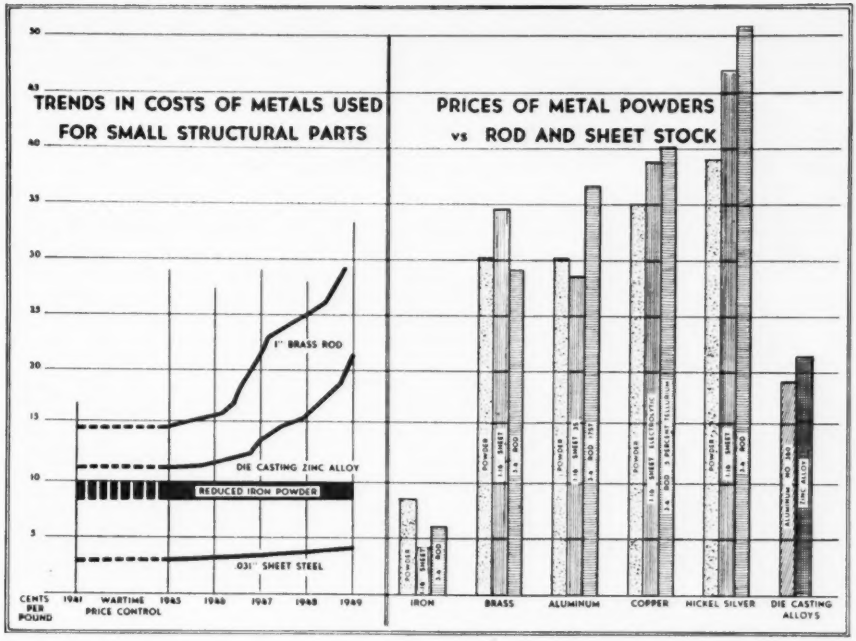


Fig. 5—Graphs showing prices of metal powders as compared with rod and sheet stock. (*Illustration courtesy Lionel Corp.*)

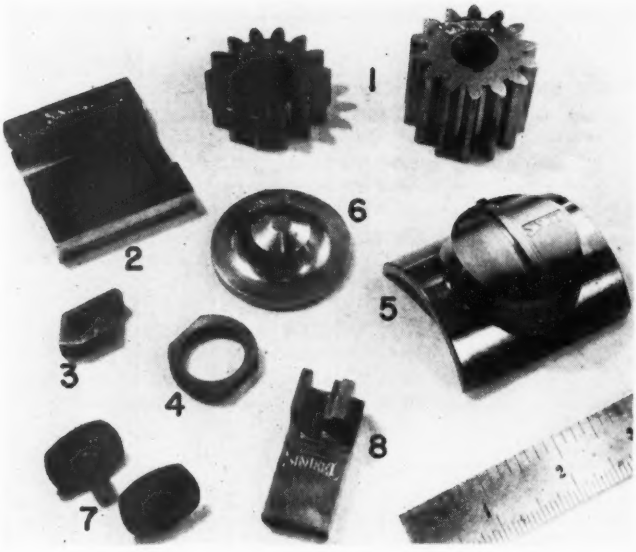
(4) Reduction in raw material inventories. Four or five powders may take the place of a large assortment of widths, gages, tempers, and compositions of metals in sheet, rod, and other special forms.

(5) Controllable coefficient of friction from friction to bearing surfaces. By varying particle size and production conditions, metal powder parts may be used as clutch plates and other friction devices or as bearings and other anti-friction devices.

(6) Amenability to surface finishing and heat treating. By taking proper precautions (because of porosity) practically all of the standard finishing methods which are used on wrought or cast metal products may be applied to metal powder parts. Similarly, heat treating operations, including annealing, quench hardening, and surface hardening by carburizing, nitriding and cyaniding may also be applied.

An interesting illustration of the use of powder metallurgy to reduce costs and to improve performance may be seen in model train car wheels such as the one illustrated in Fig. 3. In addition to eliminating extra handling and additional operations, the use of metal powder parts resulted in a reduction in scrap and the entire product was improved by obtaining a higher coefficient of friction and a lower center of gravity for the wheels.

In the upper portion of Fig. 4 is shown a toy locomotive steel tire and zinc die casting assembly which form-



1. Two gears manufactured from SINTEEL R low carbon steel. The process of manufacturing SINTEEL R lends itself to extremely close tolerance control. This material can be hardened very easily in the same manner as steels. These gears are used in oil pumps of automobiles, are only about 75 per cent dense in order to absorb oil and to provide long wear characteristics.
2. A pole piece from SINTEEL M-101 which is low carbon iron composition. This material is soft magnetic and the piece itself represents a pole piece for a hand phone.
3. Small cam hardened to Rockewll C-35, manufactured from medium carbon material SINTEEL R. An application for neon advertising signs.
4. Washer for brake assembly of automobile, hardened to approximately Rockwell C-35, manufactured from SINTEEL R.
5. Pole piece for generator of motorcycle manufactured from SINTEEL M-101, a soft magnetic iron.
6. Solenoid made from SINTEEL M-301, a low carbon high density iron material for electrical release of bomb in airplanes. The magnetic flux aensity had to be especially high in this application.
7. Centering button—SINTEEL R, a medium carbon steel alloy. This part is used for the universal joint in an automobile transmission and the part is subsequently surface hardened to Rockwell C-50.
8. Pole piece for magnetic phonograph recording head.

(Illustration Courtesy American Electro Metal Corporation)

erly required nine operations to complete. This assembly was replaced by a single metal powder compact which may be seen at the bottom of Fig. 4. A comparison of the number of operations required for the two types of wheels will readily show why the manufacturer found the cost of the completely finished and black oxidized metal powder wheel to be less than 60 per cent of the cost of the zinc alloy raw material alone.

Detailed descriptions and illustrations of many similar items which have been replaced by metal powder parts are presented in the Proceedings of the 1949 meeting of the Metal Powder Association.[4]

The Powder Picture

In addition to the degree of progress which has been made in powder metallurgy, other strong influences in the trend for the use of metal powder parts include the price and availability of the various powders. A review of post-war powder shipment figures prepared by the American Society for Metals appeared in January, 1949.[6]

Shipments of grain copper and iron powder, representing about 90 per cent of American production, show that copper powder manufacture in 1947 was 31 per cent higher than in 1945 and 16 per cent higher than in 1946. Iron powder shipments for 1947 were 55 per cent higher than in 1945 and 22 per cent higher than in 1946. In addition, the amount of iron powder available has

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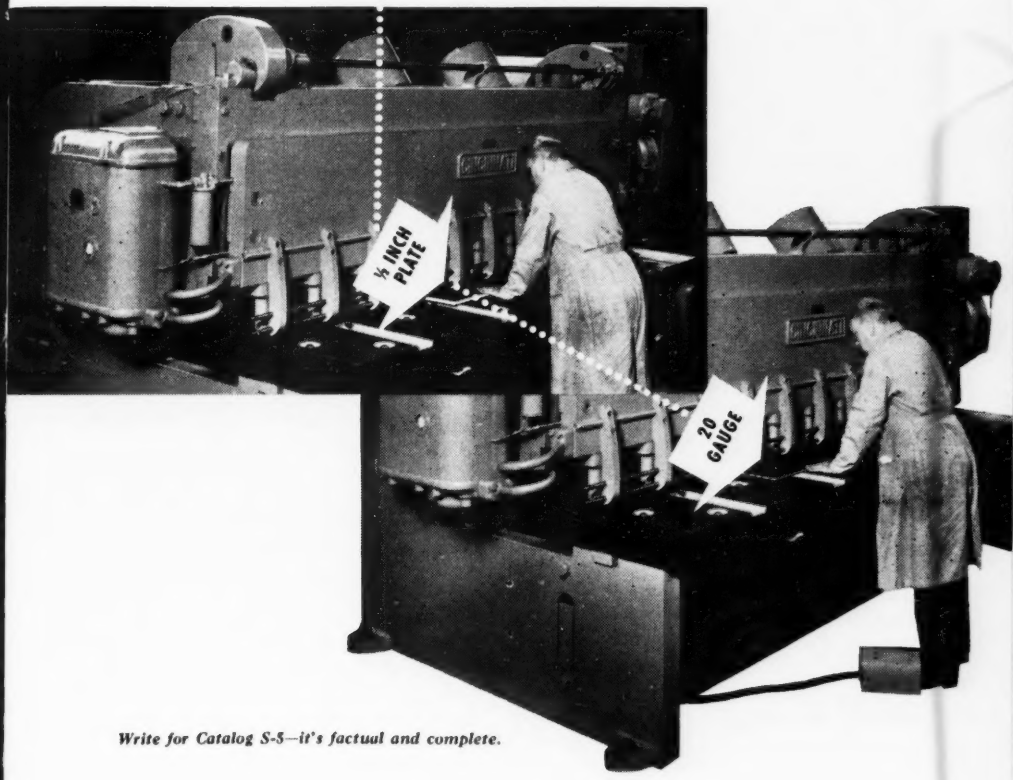

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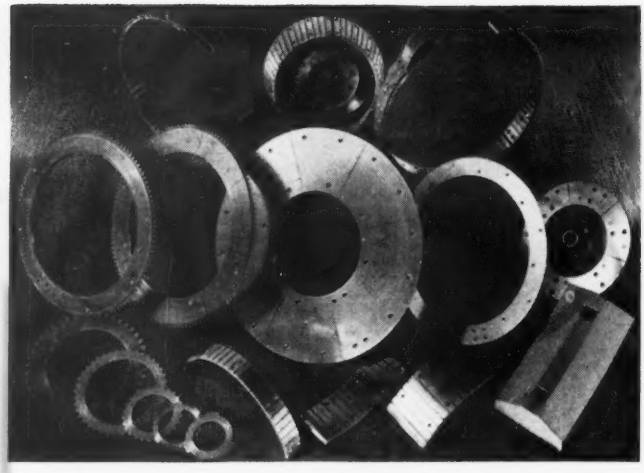

Illustration showing a variety of "Velvetouch" items in which lead powder is an important component. (*Courtesy S. K. Wellman Co.*)

when one takes into account the scrap losses involved in the stamping or machining of small parts—a loss which becomes increasingly greater as the parts grow smaller."

been considerably increased by sizeable imports of Swedish iron powder which is made by refining granular sponge iron. Powder imported from Sweden was a negligible quantity in 1945, but it amounted to one-third of the total iron powder used in 1947 and an even greater percentage in 1948.

Some interesting observations were made by J. L. Bonanno, chief engineer of the Lionel Corporation, at the 1949 annual meeting of the Metal Powder Association concerning prices of metal powders as compared with those of rod and sheet stock (see Fig. 5).[4] Mr. Bonanno observed that, "Iron powder today is the cheapest material of construction and in contrast to the general upward trend in the metal market has maintained a constant price level. During this period the quality of powder from all sources has steadily improved. Recalling the prewar demand for a 'good five cent' powder, one might say that based on today's 60-cent dollar, the goal has been achieved . . . . While the cost of most metal powders is not significantly different from the price of the same materials in rods and sheets, the scale tilts heavily in favor of powder

New Developments in Technique

No matter what course the advancement of powder metallurgy takes as an industrial process, it will undoubtedly be influenced by improvements in existing fabricating techniques. One method that appears promising is "hot-pressing", a means of combining pressing with sintering and thus eliminating the latter operation as a separate step.

The advantages of hot-pressing combined with suitable atmosphere protection or the use of vacuum methods to remove evolved or entrapped gases may be summarized as follows: (1) high density, (2) avoidance of oxide, (3) accuracy of size, (4) high tensile strength and hardness, and (5) great elongation. However, it is also shown that many problems accompany the use of the hot-pressing technique. These problems may be listed as (1) the confinement of heat to the die cavity and the compact, (2) the necessity of developing die materials which are capable of withstanding the high pressures and temperatures involved, (3) the necessity of finding high-temperature materials which are capable

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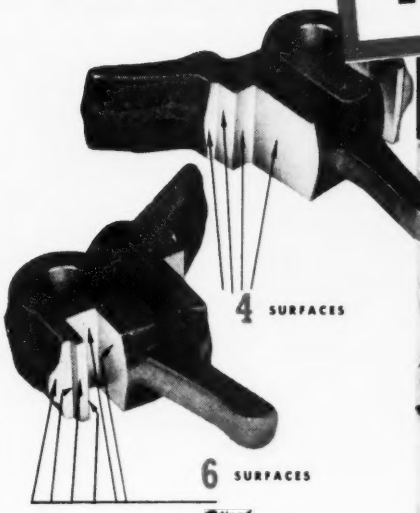

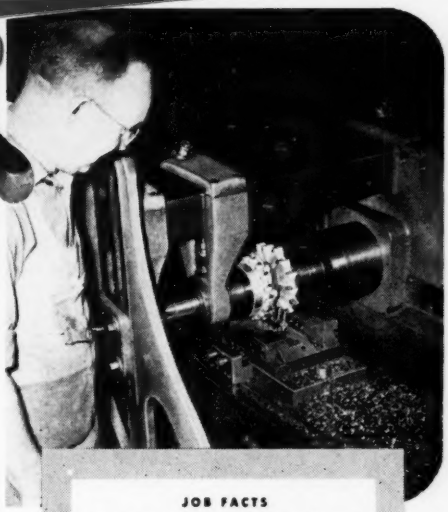

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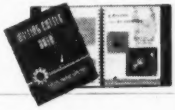

JOB FACTS

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Material — SAE 4615 Forgings, 180 Br.
Cutters — B-C Job-Engineered Half-Side Mills and Full-Side Mills, Carbide-Tipped, Negative Rake
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Speed — 187 RPM
Fl-to-Fl — 4 minutes per load
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of acting as lubricants and as parting compounds in preventing excessive die wear and welding of the compact to the punch facings or die walls, (4) the creation of a method for surrounding the compact with reducing or neutral atmospheres while at high temperatures, or of removing gases as formed by vacuum methods, and (5) a search for better means of ejection and controlled cooling of the hot-pressed compact.[7]

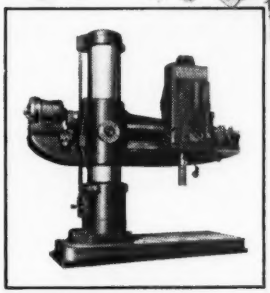
Several laboratory hot-pressing methods are in existence, and at least one of these methods has been extended to the pilot plant stage. Steel-backed bearings wherein the anti-friction material consists of a combination of metal powders, carbides, and borides are now being produced by hot-pressing techniques in a pilot plant of the National Diamond Hone and Wheel Company.[8] The die used for holding the powder becomes, in this case, the steel backing sleeve of the bearing. The powder mixture is pressed around a central core under 800 p.s.i. pressure. This lower than usual temperature is possible because the materials being pressed are in a semi-plastic condition as a result of the heat. By heating the entire unit 25 seconds by induction, sintering takes place simultaneously with pressing and, also the bearing material is welded to the steel backing. After ejection, the only operations needed are to knock out the core, cut the sleeve to length, and finish off the bearing surface.

"Impregnation" is another relatively new innovation in powder metallurgy. Since the porous structure of sintered compacts is the chief reason for lowered physical properties, it follows that by filling these pores with another material, substantially improved physical properties will result. Hence, iron powder compacts are often impregnated with molten copper, lead, or babbitt in a vacuum. The tensile strength of an iron powder compact impregnated with copper may average between 50,000 and 100,000 p.s.i. while that of an ordinary iron-copper compact (2-11 per cent copper) will average between 30,000 and 45,000 p.s.i.[9] Sometimes non-metallic impregnants are used. Much may be said for this method of refinement, and undoubtedly the future will bring about more widespread and less expensive applications of the principle of impregnation.

Sources of Powder Metallurgy Information

Coupled with fundamental research in the science of powder metallurgy is an equally important consideration, the proper dissemination of the information developed. Meetings of the Metal Powder Association provide excellent means for discussing both plant and laboratory developments as an industrial technique; and meetings of technical societies, namely the American Society for Testing Materials (Committee B-9) and the powder metallurgy committees of the American Society for Metals and the American Institute of Mining and Metallurgical Engineers, provide opportunities for discussing the more basic concepts of powder metallurgy as a science.

The Metal Powder Association is a non-profit organization whose membership is open to producers of metal powders or of articles made from metal powders. Manufacturers of equipment and/or supplies which are used in the production of metal powders or metal powder products, and consulting or research organizations dealing with powder metallurgy problems are eligible for associate membership. The Association in staffed with technically qualified personnel who are prepared to answer questions from interested parties concerning sources of metal powders and metal powder parts as well as to provide them with information regarding powder metallurgy.



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Each year the Association sponsors a Metal Powder Show and meeting at which the newest and latest powder metallurgy products may be displayed and technical and economic papers pertinent to powder metallurgy may be presented and discussed. Proceedings of these meetings are published by the Association and sold at-cost to those who are interested. Figures for the 1949 Show and meetings indicate the following attendance breakdown given in percentages of the total attendance: consumers of fabricated parts, 42 per cent; fabricators of metal powder parts, 27 per cent; equipment manufacturers, 17 per cent; and powder producers, 14 per cent. Such Shows and meetings, which are devoted exclusively to discussions of powder metallurgy, give those who attend opportunities to compare notes; and they also help to minimize, if not to eliminate, the penchant for secrecy held by most companies which are engaged in developing a relatively new industry, of which powder metallurgy is a prime example.

Table 1

Title of Standard	MPA Designation	ASTM Designation
Sampling Finished Lots of Metal Powders	1-45	B215-48
Determination of Hydrogen Loss of Metal Powders	2-48T	——
Determination of Flow Rate of Metal Powders	3-45	B213-48
—Statistical Precision of Above	Sup. 3-45	——
Determination of Apparent Density of Metal Powders	4-45	B212-48
—Statistical Precision of Above	Sup. 4-45	——
Sieve Analysis of Granular Metal Powders	5-46T	B214-48
Determination of Insoluble Matter in Iron and Copper Powders	6-48T	——

Powder Metallurgy No Panacea

The examples of parts made by powder metallurgy methods which have been cited are typical of hundreds of others in which similar, though perhaps not so spectacular, cost savings have been gained through the application of this relatively new technique to parts which were formerly produced by other means. Of course, it must be remembered that for as many applications in which powder metallurgy is used as the solution to production problems, there are probably as many or more marginal cases for which its use may be a "toss-up" or for which the powder metallurgy method actually has nothing to offer.

Powder metallurgy is no panacea; it is not the answer to industry's never-ending quest for a means of producing a better product at a lower cost. The making of finished compacts out of metal powder cannot be compared to the job of pressing out aspirin tablets. The pressures required are tremendous—varying from 20 to 50 t.s.i.—and the presses needed for these

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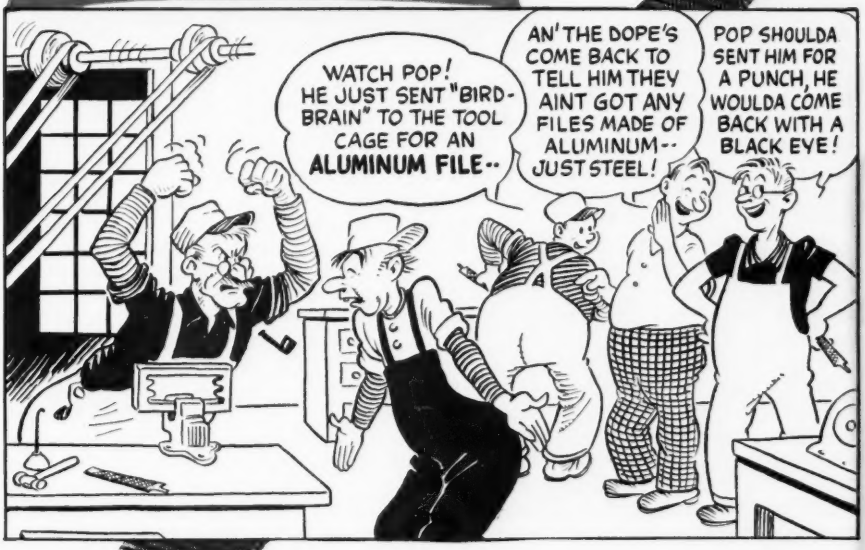
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operations are big and expensive. Sintering presents complications also; oxidation, the nemesis of practially all metals, can literally destroy most metal powders at ordinary sintering temperatures. This problem may be overcome but only by using high-priced controlled-atmosphere furnaces.

Because of the tremendous compacting pressures required, dies must be strong; and because of friction and abrasion caused by ejection, they must also be tough and abrasion-resistant. Dies which are constructed of tool steels for powder metallurgy applications cost on the average of several hundred dollars for a single job; and special carbide dies which are also used cost even more, averaging several thousand dollars per job.

Thus, the factor of high initial investment coupled with that intangible but invaluable prerequisite, technical know-how, may be given as the reasons why the major portion of powder metallurgy parts made today are produced by custom fabricators and not by the individuals planning to use the parts. These factors explain also the absence of "fly-by-night" operators. The plants which are devoted to powder metallurgy make up a young but growing industry based on sound principles of science; the production of parts from metal powders is an industrial process that has found, and moreover will hold, a place for itself in modern industry.

Standardization

When a new industry begins to take hold, its first attempt to stand alone is usually evidenced by its recognition of the need for standardization. Such is the case with the powder metallurgy industry. In 1945, the Metal Powder Association formed a Standards Committee whose objective was to review and study all test methods pertaining to metal powders and to issue as standard methods those having general application to powder metallurgy. Table I lists the standards now in use.

As indicated in the table, the American Society for Testing Materials (Committee B-9) has adopted four of the existing MPA Standards for metal powders. In addition, they have issued specifications for oil-impregnated metal powder sintered bearings (B202-45T) and metal powder sintered structural parts (B222-47T).

Under consideration for adoption as standards by the MPA Standards Committee are (1) methods for determining the total iron, metallic iron, and iron oxide content of iron powders, (2) methods for determining the green strength of pressed unsintered metal powder parts, and (3) methods for making acceptance tests on structural parts made from metal powders.

Considering the facts that complex design and production obstacles may be overcome through the use of powder metallurgy and that advancements in engineering continue to be made in the field, even the most skeptical may be convinced that powder metallurgy is here to stay. Thus powder metallurgy presents a challenge to the user of fabricated metal parts. Perhaps by adopting powder metallurgy methods and/or parts, he can find a way to make his product faster, cheaper, or better. He must not expect too much from powder metallurgy, but he should approach it with an open mind to see what it can really do for him.

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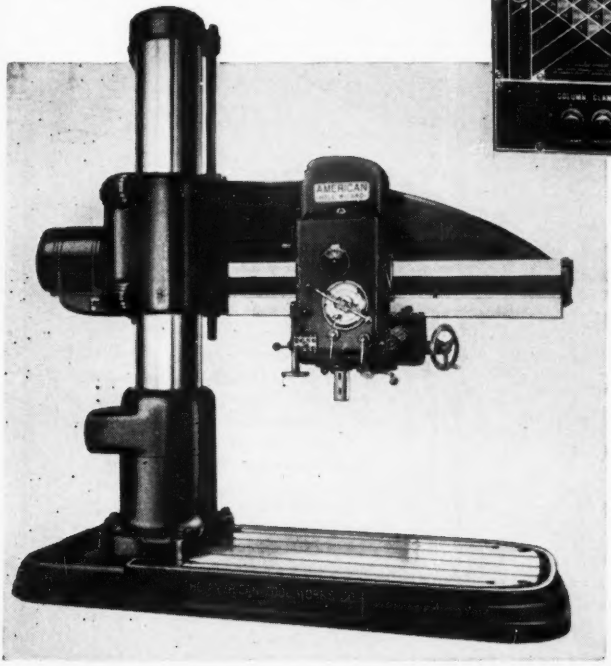

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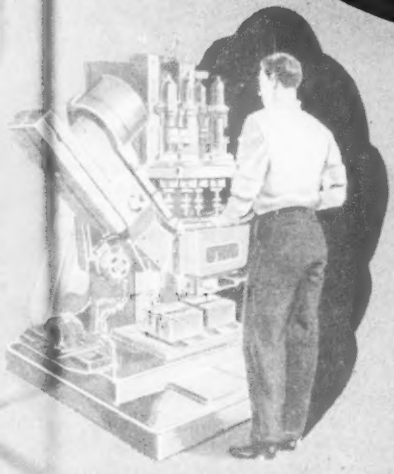

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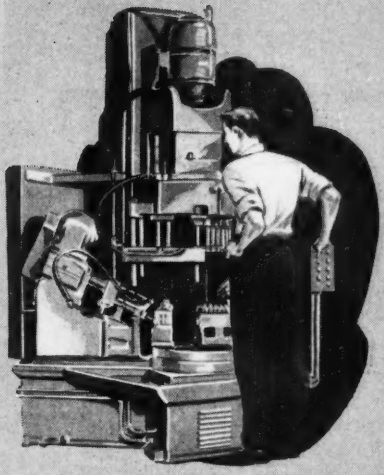

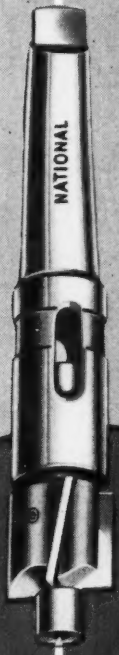

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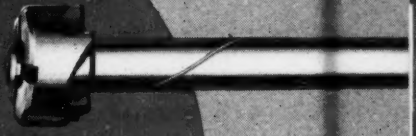

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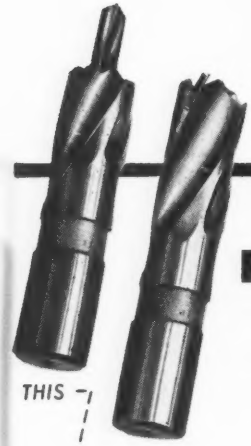

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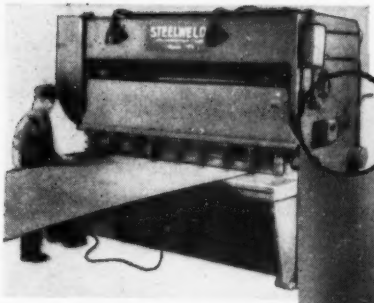

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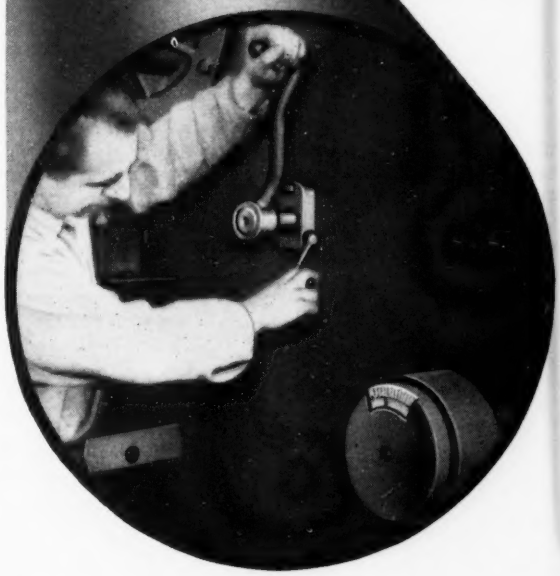
Steelweld Shears are built for thicknesses of 12 gauge to 1¼ inch and for lengths of 6 to 18 feet.



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THE CLEVELAND CRANE & ENGINEERING CO.
6411 East 282nd St. Wickliffe, Ohio

STEELWELD PIVOTED BLADE SHEARS

Arthur J. K. Delage, Jr.

Cutlery Plant Profits From Visual Efficiency Program

By Arthur J. K. Delage, Jr.
Personnel Manager, Russell Harrington Cutlery Company

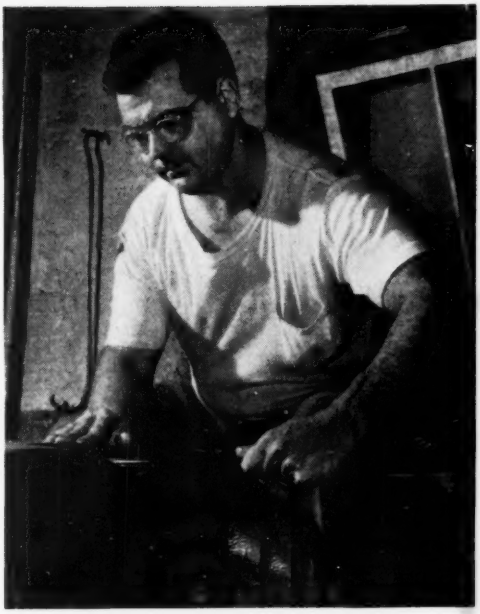
JUST a little more than three years ago, our company installed a program aimed to improve our safety record through attention to the visual efficiency of our employees. This article is a brief outline of the procedures involved and the results obtained from its application in our plant.

Because a number of our employees were receiving first aid treatment for the removal of foreign bodies from their eyes, we invited the American Optical Company to conduct a study of our operations and to submit recommendations for a more adequate eye protection program. In addition, we asked our plant safety engineer to make a re-study of hazards to see whether some of them could be better controlled through a more extensive application of protective guards, exhaust fans, and the like.

After making a thorough survey of our plant, the optical company's representative recommended that we install what he called their Industrial Safety and Visual Efficiency program. We found that it involved the following:

1. Leasing a vision checking instrument, known as the AO Sight-Screener.

William C. Schneider, Russell-Harrington's Safety Engineer, checks an employee's vision on the Sight-Screener. If check indicates need for visual care, the employee will be referred to a professional man of his choice.



After consultation, the employee was fitted with corrective-protective goggles which he wears on his present job. He is shown here hand grinding one of Russell-Harrington's famous "Dexter" knives.

2. Securing the part time consultant services of a vision specialist who would be responsible for:
   a. Assisting us in making a study of the visual demands of all of our plant and office jobs.
   b. Assisting us in setting up and administering a procedure for periodic checking of employees' visual capabilities.
   c. Assisting us in identifying employees with visual problems, referring them for eye care, and making recommendations concerning work assignments of those whose problems were uncorrectable.
   d. Assisting us in the establishment of visual standards to be used in checking new employees' visual capabilities.
3. Setting up procedures for providing all employees in eye-hazardous jobs with proper eye protection—either plano goggles, goggles incorporating the employee's own prescription or, in a few cases, welding helmets or face-shields—as well as procedures for maintaining such protection, e. g. cleaning facilities, replacements for pitted lenses, tightening loose frame screws, aligning side shields, and so on.

The procedures recommended were satisfactory, and we proceeded to carry them out. When the lease and service agreement had been completed, we engaged a vision specialist who was particularly interested in working with us. We both agreed that he could, in a half-day per week, discharge fully all the responsibilities outlined above.

The first step in getting the program under way involved the selection and training of a person to administer the screening check with the aid of the Sight-Screener. Working in cooperation with the AO representative, our vision consultant trained the person designated to a suitable degree of proficiency. Notices were posted on bulletin boards and a meeting of all department heads served as the media through which the advent of the program was announced.

It had been decided that the screening would be done by departments. Therefore, our consultant vision specialist, one of our time study men and the AO representative made a complete study of the visual demands of each job, in the various departments before screening was initiated. The in-

JOB VISUAL DESCRIPTION

Job Titles: Stone grinder, large blade — Dept. Machine Grinding

Brief Description of Visual Tasks Performed: Picks up blade and holds against wheel with fingers of left hand. With right hand moves blade back and forth against wheel. Inspects frequently until sure that spots and nicks have been removed. Dresses wheel with heavy dressing tool at frequent intervals.

PRINCIPAL WORK POSITIONS:

Standing ☐ Sitting ☒ Working Aloft ☐ Moving About ☐

Other ☒ Bending over

Unavoidable Glare Conditions . . . . . None ☒ Reflected ☐ Direct ☐

WORK DISTANCES	POSITION OF WORK					
	Below Eye Level		Eye Level		Above Eye Level	
	Often	Seldom	Often	Seldom	Often	Seldom
Closer Than 14 Inches						
Reading Distance	X					
Arm's Length	X					
30 Inches to 7 Feet						
7 Feet and Over						

LATERAL VISUAL SWEEP: NORMAL ☒ WIDE ☐ NARROW ☐

NATURE OF VISUAL HAZARDS: Impact from sparks during grinding. Severe hazards from flying stone during dressing operation.

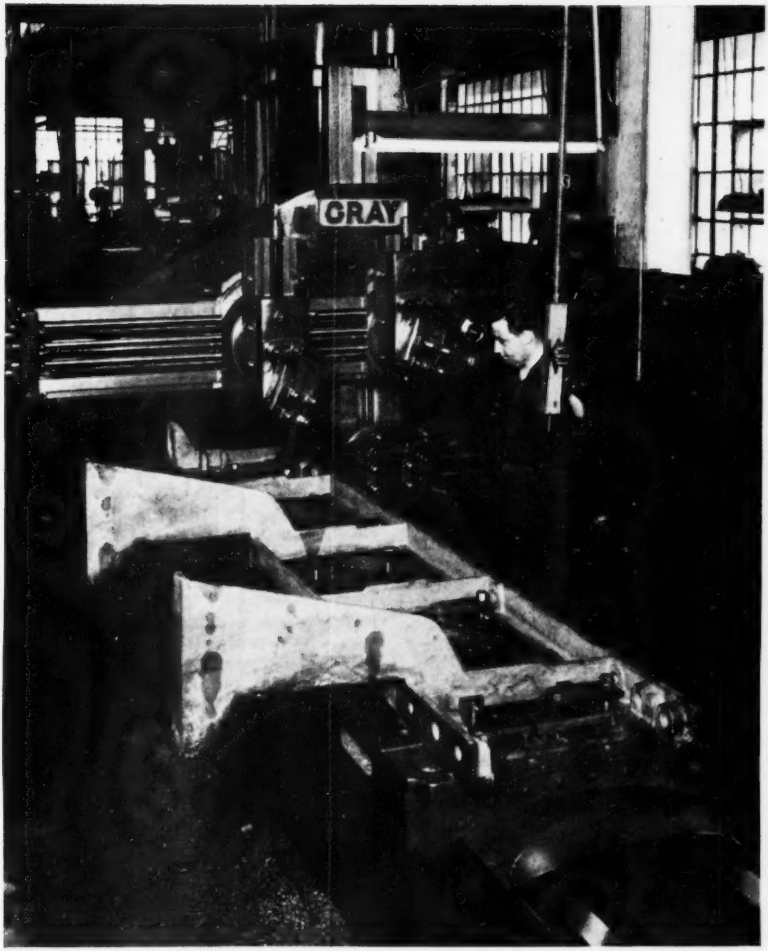
Front side of chart on which data regarding visual demands of each job was recorded.

formation thus gained was used to determine whether an employee's visual problems, as shown by the vision check, were severe enough to warrant a referral recommendation. Copies of the job visual description data were later given to each referred employee so that his refractionist would have reliable data to guide him in prescribing a correction specifically adapted to the particular visual demands of the employee's job where these were unusual.

About a month was required to complete the study of job visual demands and to administer vision checks to our 277 shop and office employees. We could have proceeded more rapidly but thought it wiser to refer cases at a rate which would permit practitioners in our community to handle referrals more conveniently. Of the total checked, 83 employees, or nearly 30 per cent, were found to have visual problems severe enough to warrant referral. While many persons under 40 years of age were found to have visual problems, the majority was in the group over 40, the age when presbyopia becomes a commonly prevalent problem.

Each employee who was found to be in need of referral was then called to the personnel office, informed of his need for visual care and urged to obtain an examination as soon as possible. If the employee was in an eye-hazardous job, he was then provided with a form which he was instructed to give to the examining doctor so the latter could record the specifications for an appropriate corrective-protective prescription.

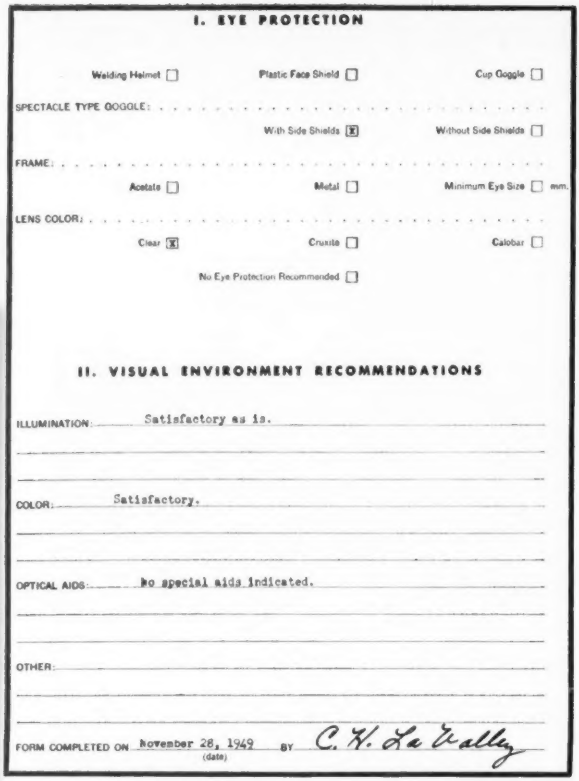
The prescription indicated by the refractionist was then ordered from the optical company. When it had been made up, the employee took the glasses back to his refractionist for verification and fitting. While the employee was charged the refraction fee, the company paid a part of this fee plus a part of the cost of the goggles.



GRAY OPENSIDE PLANER CUB PLANES BIG JOBS QUICKLY, EASILY AT R. A. JONES CO., Inc., Cincinnati, O.

The R. A. Jones Co., Inc., Cincinnati, has many small planer jobs. The Jones Cartoner side frame pictured is typical. Carbide Tools are regularly used and planing accuracy is greatly improved on this powerful, high-speed planer. Here, a Gray Openside Planer Cub produces as much as 3 old machines. Its versatility and productivity make the new Gray Planer a real cost cutter.

For complete information write the G. A. Gray Company, Cincinnati, Ohio.



I. EYE PROTECTION

Welding Helmet ☐ Plastic Face Shield ☐ Cup Goggle ☐

SPECTACLE TYPE GOGGLE:

With Side Shields ☒ Without Side Shields ☐

FRAME:

Acetate ☐ Metal ☐ Minimum Eye Size ☐ mm.

LENS COLOR:

Clear ☒ Cruxite ☐ Calobar ☐

No Eye Protection Recommended ☐

II. VISUAL ENVIRONMENT RECOMMENDATIONS

ILLUMINATION: Satisfactory as is.

COLOR: Satisfactory.

OPTICAL AIDS: No special aids indicated.

OTHER:

FORM COMPLETED ON November 28, 1949 (date) BY C. W. La Valley

Back of chart on which data regarding visual demands of each job was recorded.

A payroll deduction plan permitted employees to make their payments over an extended period if desired.

The final step was to establish maintenance facilities. A tool kit which could be used to perform minor repairs was secured by the personnel office where a small stock of plano goggles and frames was maintained.

It was also in the personnel office that our consultant vision specialist made his headquarters during the one afternoon a week that he spent in the plant. Employees called at this time to discuss their visual problems, if they had any, and to obtain any minor fitting readjustments that were required. More serious problems were always referred back to the employee's own examining doctor. In addition to these services to employees, our consultant conferred with the writer concerning the visual capabilities of new employees and present employees being considered for transfer to more visually demanding jobs. Initial job requirement standards were revised in the light of augmented experience and he also gave us a number of helpful suggestions for altering illumination conditions of some operations where employees had complained of difficulty.

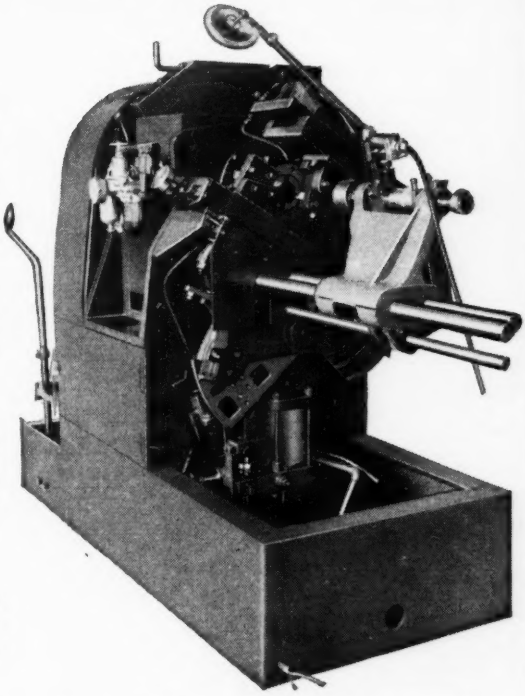
When the program had been in operation for a little more than a year, we decided to make an attempt to evaluate the effectiveness of the program in reducing injuries. At first we considered the frequency of lost time injuries, but discovered that we had too few to afford a reliable estimate of change. Therefore, we decided to count the number of minor injuries sustained by all employees who had received corrections and who had been performing the same job for the last twelve months. In all, 22 employees were found who satisfied this requirement.

Although our plant is too small to maintain a regular dispensary and a full-time registered nurse, we do have facilities for giving first aid. A record of first aid treatments is maintained in diary form by a practical nurse

Cuts Off Tubing, Pipe and Shafting---

FAST

If your production requires cutting off tubing, pipe or shafting in quantities, particularly in long lengths, check the figures below against your present time.



½" Tubing

This machine cuts off and chamfers both outside edges of ½" .030 wall tubing, 5" long at the rate of one every 2.5 seconds.

1¼" Cold Rolled

This machine cuts off and chamfers both ends of 1¼" cold rolled, 20" long, at the rate of one every 20 seconds.

1" Tubing

This machine cuts off and chamfers both outside edges of 3" long, at the rate of one every 3 seconds.

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These popular, time saving machines are now available in two sizes, handling work up to 3" O.D. Their many cost cutting features are described and illustrated in our latest catalog that will be mailed promptly on request.

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Jackson, Michigan

TABLE I

First Aid Treatments Before and After Eyecare

Case	Job Title	Department	Before	After	Difference
1.	Working foreman	Assembly	2	0	−2
2.	Working foreman	Handle manufacture	3	2	−1
3.	Working foreman	Packing	0	0	0
4.	Working foreman	Tempering	1	3	+2
5.	Saw operator	Saw Room	3	5	+2
6.	Saw operator	Saw Room	1	2	+1
7.	Handle finisher	Handle finishing	4	1	−3
8.	Handle finisher	Handle finishing	5	5	0
9.	Handle finisher	Handle finishing	4	0	−4
10.	Machinist	Machine shop	2	1	−1
11.	Machinist	Machine shop	2	2	0
12.	Stone grinder	Grinding	1	0	−1
13.	Stone grinder	Grinding	0	0	0
14.	Polisher	Handle finishing	3	1	−2
15.	Glazer	Blade finishing	0	1	+1
16.	Shaper	Handle manufacture	2	2	0
17.	Forge hand	Forge shop	0	0	0
18.	Set-up man	Blade stamping	2	1	−1
19.	Inspector	Blade finishing	1	0	−1
20.	Inspector	Blade finishing	1	0	−1
21.	Clerk	Shipping	0	0	0
22.	Clerk	Shipping	1	0	−1
		TOTAL	38	26	−12

who also doubles as a production record clerk. Therefore, a set of tabulations was made for each of the 22 employees showing the number of original first aid treatments received in the period six months before and six months after obtaining new corrections as a result of the vision program. The results are shown in Table I.

It is apparent that there was a 32 per cent decrease in the number of first aid treatments received in the 6-month period following eye care. Calculation indicates that the chance probability of a change as great as this is slightly less than ten in one hundred. It should be noted that the data include treatments for burns, cuts, contusions, abrasions and blisters—a minority of the first aid treatments were solely for the removal of foreign bodies from employee's eyes.

In view of these facts, we felt justified in concluding that we had made real strides toward our goal of improved safety at work. This impression was confirmed when employees commented frequently on their feeling of greater security and comfort at their work. While we cannot prove it,

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★ **Fast-lift and slow-lift Mechanism**

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★ **Four point support**

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★ **Positive floor-lock**

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because comparable records are not available, our foremen tell us that new employees hired since adoption of the vision program have been easier to train, while present employees whose vision has been corrected turn out work of better quality.

At the end of the second year, our visual consultant recommended that all employees be given a periodic re-check. He pointed out to us that in several instances experience had dictated the advisability of higher visual standards and explained that many who had not been referred originally could be expected to have developed visual problems that should be corrected.

A periodic review was therefore scheduled and 286 persons were given the visual screening re-check. Of this number 58, or about 20 per cent were found to have visual problems severe enough to warrant referral. With only one or two exceptions all of these employees secured corrective safety goggles. A year later a second screening re-check was scheduled. This time 37 out of 234 persons checked were referred. This was a little over 4 per cent less than the previous year.

We feel confident that the next recheck will reveal an even smaller proportion of cases requiring eye care, but we are convinced no cases should be missed; good vision is one of our greatest assets.

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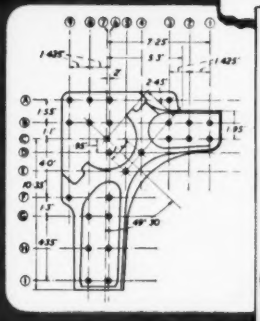
Remember, there's a Jewel product for every sanding, polishing and grinding need.
Abrasive Products, Inc.

Foot Shears. Niagara Machine & Tool Works, Buffalo 11, N. Y., has published a 12-page three-color bulletin (No. 80F-A) describing and illustrating its complete line of all-steel foot shears with cutting lengths from 22 inches to 6 feet on 16 gauge sheet steel and of 8 and 10 feet on 18 gauge sheet steel. Copy free.

BULLARD SPACER Goes to Work

The de Havilland Aircraft Co., Ltd., are getting good results with a Bullard Man-Au-Trol spacer unit which they are now using in conjunction with an Asquith O.D.I. radial drilling machine in their Hatfield works. By eliminating jigging or marking out in the drilling of a large range of components produced in comparatively small batches, the spacer has cut costs and speeded production. Fig. 1 shows the Asquith radial drill equipped with the spacer unit in the de Havilland factory. It is set up on a comparatively small job for a table of this size, but its versatility may be claimed as an advantage of the device, for it will deal equally well with any work within its capacity. Peacetime production of aircraft obviously calls for a good deal of comparatively small batch work. At de Havilland's they have tooled up extensively for production of their Dove aircraft of which they have sold a large number. But others of their machines are going through in small lots, prototypes and "pilot" production. For this class of work involving machining a few off of widely different components, the company are already satisfied that the Man-Au-Trol spacer unit offers interesting possibilities. It has the advantage, too, that it will work to quite close limits — the makers claim an accuracy of 0.001 in. in spacing.



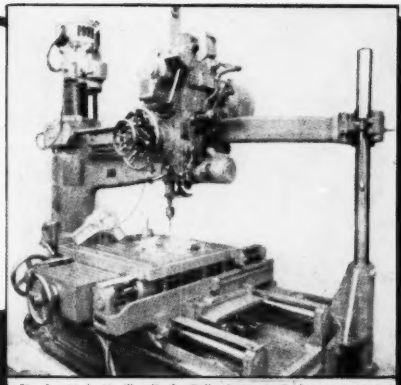


Fig. 1.—At de Havilland's the Bullard Man-Au-Trol spacer unit is mounted on an Asquite O.D.I. radial drill, the arm of the machine being secured by a clamp to an outer supporting column mounted on the base.

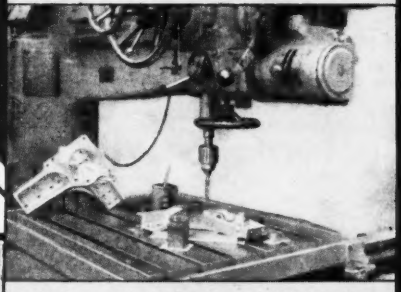
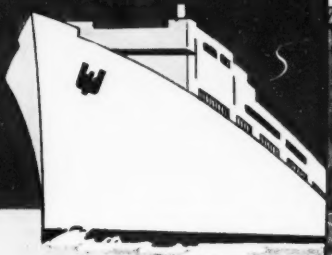


Fig. 2.—Close-up of the table, showing a typical job clamped to the surface ready for drilling. A completed component is also shown on the left of the photograph.



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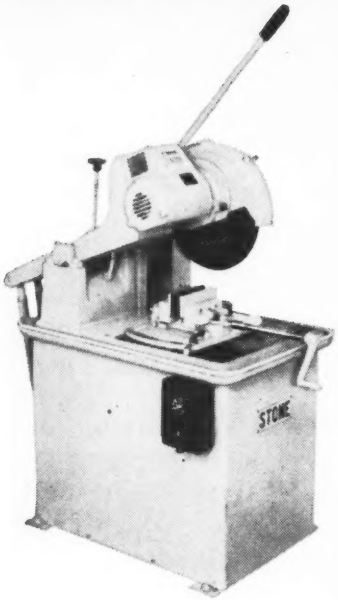

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CARBIDE BURS

C. W. Hinman

An Analysis of Shaving and Burnishing Dies

This article covers a method for automatically centralizing irregularly shaped castings and forgings and dies for progressively blanking, shaving and burnishing.

By C. W. HINMAN
Designing Engineer

IRREGULARLY shaped castings or forgings can be automatically centralized in all directions, over a die opening, for the purpose of shaving the edges. Figure 1 shows a centralizing device wherein two hand clamps or handles are pivoted under a stationary link, and equalizers are mounted in slots which have been cut in the side edges of the handles.

In operation, the handles are opened and a piece of work is inserted over the die with its forward end engaged within a positively attached V-block, which centralizes the head end of the work. At the same time, the tail on the work is located (approximately) in a channel which is cut in the die block. The hand clamps are then moved toward each other by the operator, but are stopped in a parallel position as contact is made with a stop plate which is positively attached in front of the die block.

The workpiece is centralized in position over the die by the equalizer bars which are mounted on a fulcrum pin in each handle, as shown. Each equalizer bar slides parallel with the handle in an elongated slot, and a tension spring is attached to each fulcrum pin which tends to pull the equalizers toward the rear. However, closing the hand clamps causes a long claw on each equalizer to engage the rounded edge on the work under its tail end, and clamping the handles against the stop plate forces both equalizers to travel slightly toward the front and to grasp the work firmly between them regardless of the slight variations in the widths or lengths of the workpiece to be shaved.

The long claws virtually form another V-block that pushes the workpiece positively into the attached V-block, and a shorter leg on the opposite end of the equalizers clamps, straightens, and centralizes the work over the die opening. The centralizing device just described and other similar devices are also employed for centralizing irregularly shaped workpieces in drilling and milling machines.

After clamping the work, the press clutch is engaged by the operator who depresses a treadle, and the punch de-

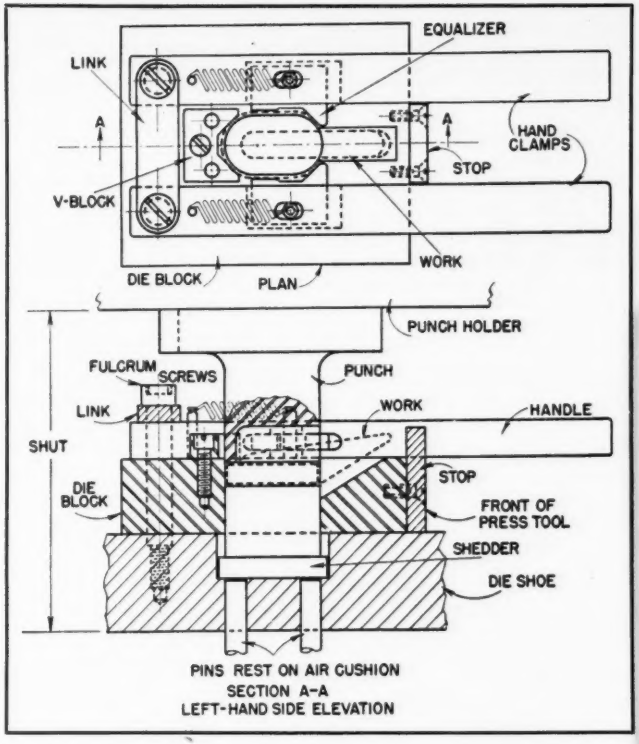

Fig. 1—Drawing illustrating the design of a semi-compound die for shaving the contour edge of an irregularly shaped steel forging.

scends and pushes the work down into the shaving die. The work is then pushed down against a shedder in the die, the shedder being supported on an air cushion which is located underneath the bolster plate. When the punch ascends, the shedder follows up under the work and delivers it flush with the die face. The ram in ascent "trips" a compressed air valve which delivers a jet of air through a fixed nozzle at one side of the die, blowing off chips and dirt. In shaving steel blanks or forgings a lubricant on the workpiece is necessary.

Castings and forgings vary in size, especially castings, and a centralizing mechanism is necessary for shaving such work symmetrically. On the other hand, workpieces blanked from sheet metals do not vary so much in width and length, and centralizing them for shaving can be dispensed with.

Progressively Blanking, Shaving and Burnishing

Figure 2 is an illustration of a five-station progressive die for high speed blanking, shaving, and burnishing of sheet metal blanks in one setup. One completed blank is ejected from the die at each press stroke. This press tool is a spring-pad die in which pad **I** surrounds all of the punches. The spring-pad is activated by coiled compression springs, two of which may be seen in the front elevation. Six to eight coiled springs are necessary, depending upon the area and thickness of the blank, and the operating conditions of the die itself.

When the punches descend to cut a blank and to shave and burnish its edges, the spring-pad contacts the work strip ahead of the punch faces. This feature in design ensures that the work strip is held down positively on the die faces before the punches begin to cut, and is the condition usually

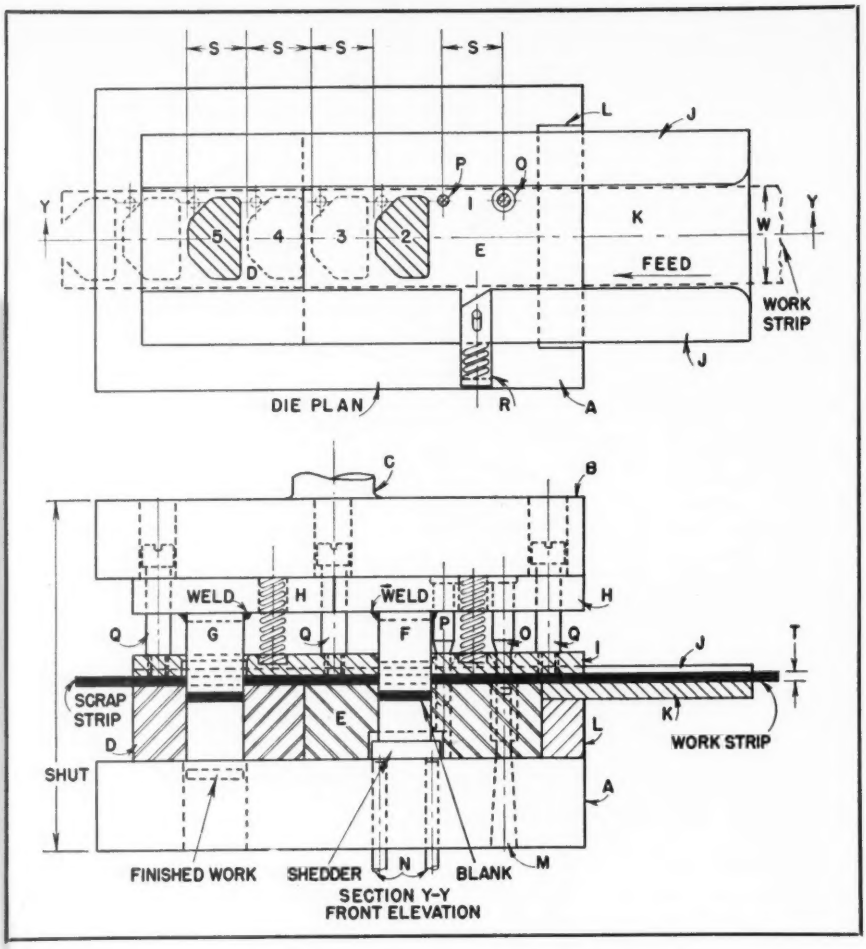

Fig. 2—Illustration of a five station progressive die that is designed for blanking, shaving, and burnishing the edges of a steel blank in one press stroke.

adopted in the design and operation of all spring-pad dies.

Thickness **T** of the work strip should not be less than 0.040 in. for small blanks like the one shown, but a greater thickness is recommended for large and irregularly shaped blanks for reinserting them in to the strip which is necessary to carry them along into the subsequent shaving and burnishing operations. A sufficient thickness of blanks prevents them from becoming disengaged from the strip which would defeat the purpose of reinserting them.

Operation of the Die

The work strip is introduced into the die over table **K** and between guides

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J - J. Feeding the strip is done by a pair of automatic feeding rolls located on the right side of the press. Finger stop **R** is depressed by the operator, which halts the forward end of the strip at the left edge of the perforated hole **O.** Holes **O** are equally spaced throughout the upper edge of the strip and are perforated in the scrap. The holes are used for piloting and registering the work at each successive station. They are spaced on blanking centers **S** and are necessary because the work itself has no interior holes for registering.

When the punches descend, hole **O** is perforated through the strip at station 1. The automatic feed rolls are then engaged and the strip is advanced one station to where pilot punch **P** enters hole **O.** This action aligns the strip and establishes the equal blanking centers **S,** for continuous operations. Feeding rolls are automatically released while the pilot is adjusting the positions of the work strip; this is one of the features in all modern feeding equipment.

At station 2 the blank is cut through the strip by descent of punch **F,** as shown in the front elevation. The cut blank is supported by a shedder in the blanking die, which is activated by vertical rods **N-N.** The rods extend through die shoe **A** and rest on a compression spring-plate or air cushion head beneath the bolster plate under the die shoe. All the die openings are sectionlined in the illustration to cause them to stand out clearly.

In the front elevation, the operation is shown with the press stroke down and

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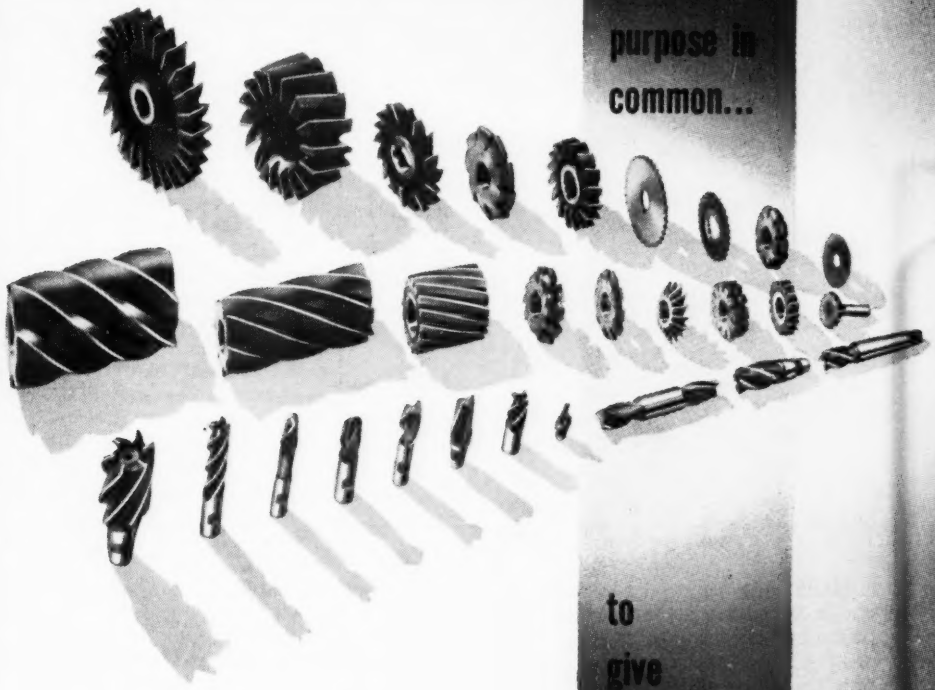

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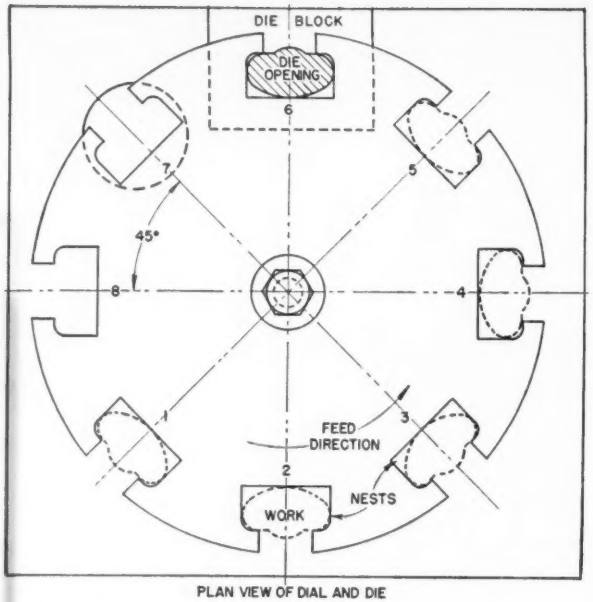

PLAN VIEW OF DIAL AND DIE

Fig. 3—A schematic illustration of a dial fed die for shaving and burnishing sheet metal blanks.

the blank cut through onto the shedder. When the punches ascend, the shedder follows up with the blank and reinserts it up into the blanked opening in the work strip from whence it was cut, while spring-pad **I** holds down the strip for that purpose.

Stations 3 and 4 are idle. Idle stations permit dividing the die blocks **D** and **E** into two separate sections. This idea helps the diemaker. It gives him a chance to obtain the exact blanking centers **S** more easily. In station 5, the inserted blank becomes positioned symmetrically under punch **G** and over the shaving and burnishing die opening. At the next punch descent, the blank is pushed out of the strip and 0.008 in. is shaved off all around its edges. Here, the shaving die opening is tapered slightly inward, below about one-half of the die block thickness. The taper is very slight, not more than 10 min. of arc. As the blanks are pushed down through the tapered die by punch **G**, their edges are burnished smoothly. The die is filled with a stack of blanks, a burnished blank being delivered below the die each time another one is shaved onto the stack above.

Since the inserted blank in the strip can be positively positioned over the shaving die, it is possible to shave only a portion of its edges if desired. It may be that only the angular portion of the blank requires shaving and burnishing. In that case the shaving die and punch

Pictured: a 24-Spindle Heavy-Duty Drill Head.

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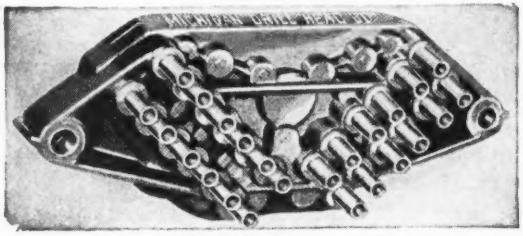

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can be positioned to meet with that special requirement.

The advantages in using this type of shaving and burnishing die are many. 1. Blanks in which there are no holes can be positively registered from a pilot hole in the scrap. 2. The entire contour of a blank or any specified edges may be shaved and burnished. 3. It is not necessary to place the blanks or remove them by hand, as in other types of such dies, and safe tools always increase the hourly output. 4. Blanking, shaving and burnishing are done in a single operation die, providing about three times the hourly output compared with other types of similar dies. 5. The finished work may be delivered into a chute beneath the die leading out behind the press. 6. The problem of chip disposal is easier to handle. A clearance space around the shaving punch and die, in spring-pad **I**, takes care of the chips which can be blown out by compressed air when the spring-pad ascends. 7. The entire operation is fully automatic and trouble-free.

The principle of reinserting blanks into the scrap strip is also employed in other progressive dies for carrying the blank into stations ahead for embossing, forming, and drawing subsequent operations. The finished piece can be ejected from the strip by being pushed out through the die in the last station, or if conditions permit, it can be carried into the next station and then pushed out through a clearance hole in the die, when the punches descend. This operation is done by a simple punch finger that contacts the work and causes it to drop out through the die.

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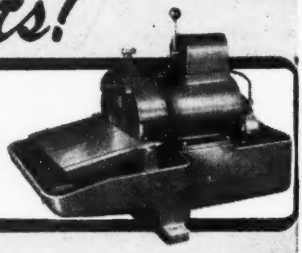

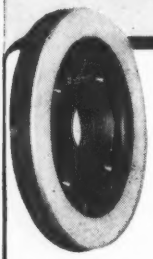

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Dial Feed Shaving and Burnishing Dies

Dial feeding equipment can now be obtained commercially. Designed in various sizes, the equipment can be of a specified number of stations and feeding strokes, featuring hydraulic operation.

Figure 3 illustrates a simple dial feed of eight equally spaced stations. The "nests" in the dial are of rectangular shape and leave generous clearance spaces for the chips. In shaving metal blanks, the chips are broken into very small pieces, which in some cases are almost a powdered metal that can be easily blown from the die, when the press-ram ascends, by tripping an air valve connected to a well directed nozzle.

The operator places blanks into "nests" at stations 1, 2, and 3, from which point the dial "indexes them around" to station 6 for shaving and burnishing. A vertical magazine chute may be employed over station 2. The operator piles up a stack of blanks in the magazine, and one blank is taken automatically from underneath the stack as the dial rotates. One blank falls from the stack into each station that passes under it.

The top surface of the last shaved blank at station 6 is 0.005 in. below the die block surface and is practically flush with the die face. This condition permits the dial to be fed ahead (after blowing out chips) to station 7 where a second air nozzle cleans the nest thoroughly blowing chips

Automatic
DRESSOMETER
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rotates diamond tool
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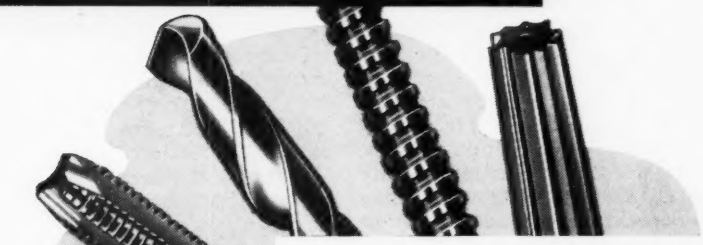

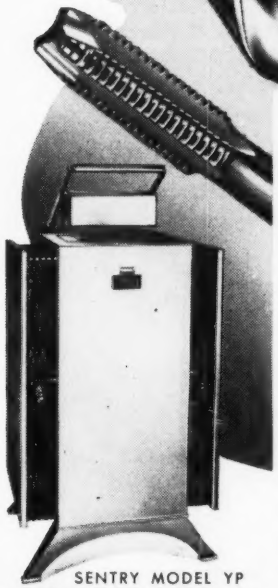

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Sentry DIAMOND Block

down through a bored hole in the plate beneath the dial. The blanks are shaved and burnished as explained under Fig. 2.

The job is now ready for high speed production, with finished work being produced as fast as an operator is able to load the blanks. Women operators are very efficient on dial equipped presses. Seventy small blanks per minute can be finished and there is no "down time" necessary for removing the last end of an old strip and entering a new one. There is no coiled stock to handle. Favorable conditions seem to be a fixed part of using dial feeds. They should be used wherever possible.

To increase the output, a larger dial and two operators may be employed. The dial may have 16 to 20 stations, and two or three blanks can be pushed through multiple dies simultaneously. A dial feed is an ace among "safety first" tools, since there is no occasion for the operator to place hands or fingers anywhere near the danger zone around the action of the punches. Nevertheless, the punches can be fully surrounded by a slat guard, or a transparent enclosure with a pea sized light inside to expose the operation for spotting trouble should it arise.

Burnishing Interior Holes with Steel Balls

Burnishing the inside diameters of steel shock absorber tubes is done at a rate of 720 finished tubes per hour on the Colonial Utility hydraulic press illustrated in Fig. 4. The holes are burnished to 1.000 in. in diameter.

The tubes are placed vertically in a circular indexing fixture that feeds automatically; and an automatic loading and feeding mechanism for the balls is built into the machine, as shown at the left in the illustration.

The operator drops the tubes into the fixture at the loading station, two at a time. As is noticed in Fig. 4, the

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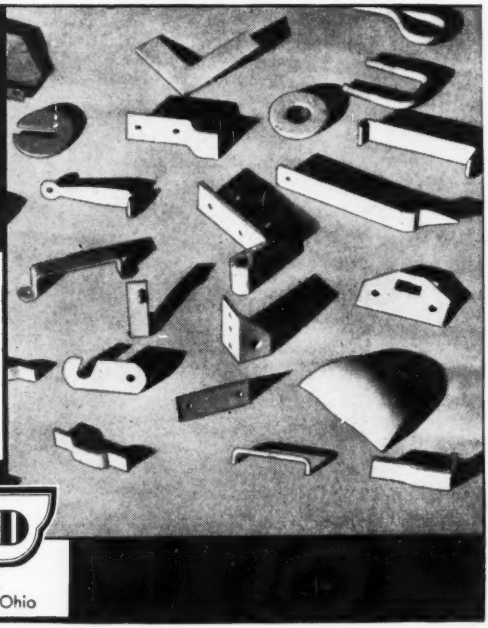

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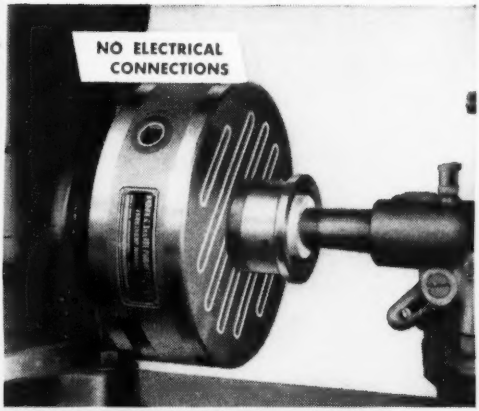

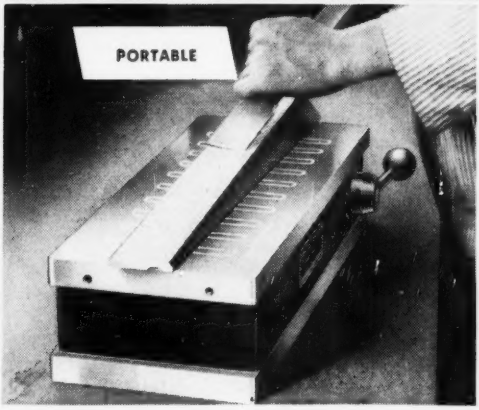

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Wherever these Brown & Sharpe permanent magnet chucks are in use, time-consuming holding jobs are made easy — economical. By a simple turn of a lever, work is held securely — another turn releases work instantly. The amount of holding power may be varied to permit accurate positioning of work.

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press-ram is fitted with a head having four vertical push rods. The two rods nearest the column of the machine are for pushing the balls through the tubes; two tubes per press stroke. The other two rods are for ejecting the finished tubes from the fixture.

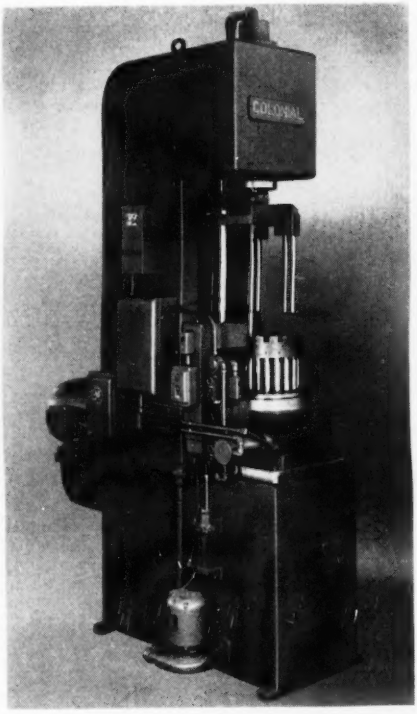

Fig. 4—View of hydraulic press and fixture for burnishing 1-inch diameter holes in steel shock absorber tubes. Burnishing action obtained by pushing through and ejecting hardened and polished steel balls.
(Illustration courtesy Colonial Broach Company)

Several balls are used in this operation, and the feeding mechanism is designed so that feeding in the balls for burnishing the tubes positions two other balls in the chute ready for release by a trigger mechanism.

When the burnished tubes are in-

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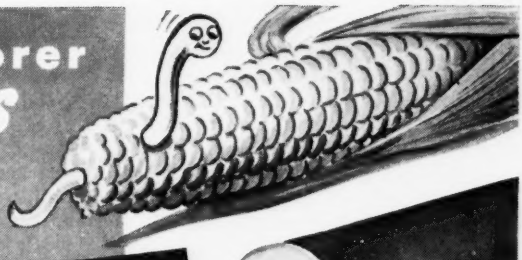

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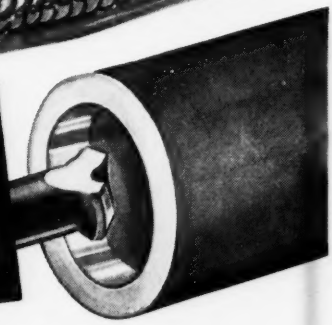
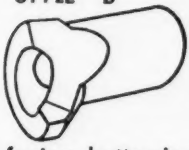


STYLE A

for general boring

STYLE B



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SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS

dexed around to the station at the extreme right of the machine, the two rods in the foregound, in descent, push the tubes down and out of the fixture. The tubes drop out through an opening in the side of the machine base.

The operation of the machine and fixture is fully hydraulic throughout. Indexing occurs near the top of the return stroke, just before the ram starts down. The machine has a rating of 6 tons capacity and with an 18 in. adjustable stroke.

Other Methods of Using Steel Balls

For burnishing the interiors of shallow pierced holes through sheet metals, commercial steel balls are forced through the holes by descent of a punch positioned over each hole. Clearance holes for the balls are provided through the die block. The balls drop into a tray under the die and roll out in front of the press, and are used again. Punch diameters are made 0.005 in. less than hole sizes, and stripping the work from the punches is obviously unnecessary.

This method has worked out well for small consignments of work, but is too slow for regular production. To burnish shallow holes rapidly, highly polished bullet-nosed punch points of cemented carbide are best for long service. The work is stripped from the punches under an open-side stripper plate which is positively attached on the die block, or for light stripping a spring-pad plate that surrounds the punches can be used. This method permits other shapes of holes than round to be burnished.

Stripping may also be performed by a "knock-off" plate that surrounds the punches, and is operated by an attached knock-out rod carried up through the punch shank. The work clings to the punches after burnishing the holes, and is carried up when the punches ascend. Stripping occurs in ascent,

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BOYE & EMMES
16" LATHE
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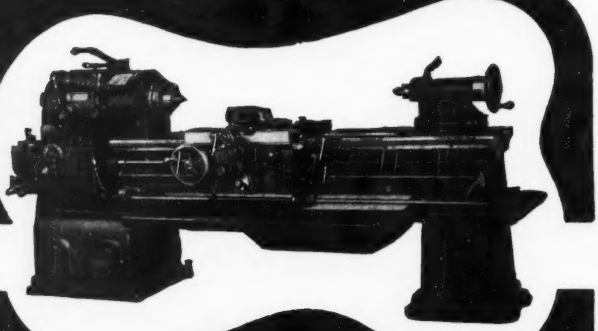

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It has extra **speed,** because of its extreme rigidity and saw support which enables more feet-per-minute in saw travel. It has **accuracy** which gives square, true cuts, reducing machining time.

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Model J, a heavy sturdy tool, cuts 10" rounds, 18" flats. Model B (illustrated) lighter, portable, of rigid twist-proof construction, cuts 5" rounds, 10" flats.

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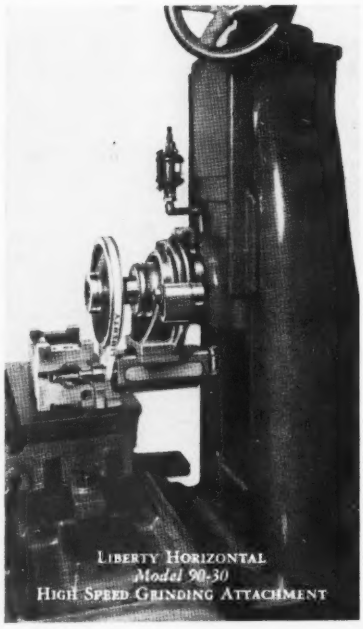

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MACHINE AND TOOL WORKS
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when the free end of the knock-off rod contacts a crossbar in the press head and depresses the knock-off plate and strips the punches. The method of stripping depends upon the conditions involved in the job.

Drill Jig Bushings. An unusual quick-reference catalog (No. B-649) presenting all essential dimensions and information on any standard drill jig bushing or liner at the flip of a single page is available from Colonial Bushings, Inc., P. O. Box 37, Harper Station, Detroit 13, Mich. The catalog is printed on extra heavy stock to withstand continuous usage and is provided with a rugged coiled wire binding so that pages lie flat. Two colors are used for ease of locating the specific liner or bushing desired. Included in the catalog is information on how to order both standard and special bushings; material specifications; grinding stock allowed; and so on. A table of drill sizes and decimal equivalents is provided on the back of the catalog. Copy free.

Carbide Dies. Six separate case studies showing how carbide dies can be used to increase production, reduce costs, and improve quality are presented in a 12-page brochure prepared by Lincoln Park Industries, Inc., Lincoln Park 25, Mich. The brochure is illustrated throughout with pictures of dies, parts produced, and scrap strips, as well as charts and tables showing how economies were achieved. Also included is a description of the company's diemaking facilities and an illustration of the variety of products that can be economically produced with carbide dies. Copy free upon request.

Enclosed Helical Gear Drives are featured in a 16-page engineering manual (MPA) released by the Foote Bros. Gear & Machine Corp., 4545 S. Western Blvd., Chicago 9, Ill. The manual contains complete ratio information, horsepower rating tables, data on simplified selection procedure and overhung load capacities, assembly diagrams, and dimensions and weights of single, double, and triple reduction units. Copy free.

Combination Oil Cup and Oil Gage, available in 1, 2, 4, and 8-oz. capacities, is illustrated and described in Bulletin No. 31 available from the Trico Fuse Mfg. Co., Dept. MMS, 2948 N. 5th St., Milwaukee 12, Wisconsin. Copy free.

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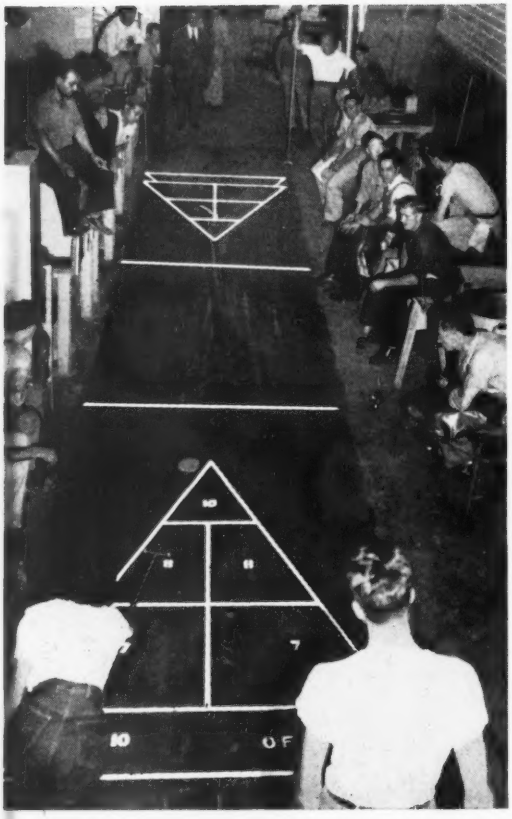


Fig. 1—Shuffleboard game in progress at the El Segundo plant of Douglas Aircraft Co.

A Little Play Paves The Way

By GILBERT C. CLOSE

Douglas, El Segundo plant adopts recreational program in which all employees may participate.

A RECREATIONAL program for industrial employees may be said to be successful if several definite preestablished objectives are achieved. The objectives of a typical program should be to boost employee morale, to inspire teamwork along with friendly rivalry, to provide relaxation and momentary forgetfulness from job worries, and to be universally applicable so that all employees regardless of age, sex, job importance, or social status may participate with equality and with mutual enjoyment.

From the standpoint of management, tangible and intangible results of a recreational program must be seen in order to justify its costs. As results of such a program, better personnel relations should be fostered, personnel turnover should be reduced because of increased job satisfaction, and better and more consistent production should be obtained.

The realization of these goals is a big order, but it is not an impossibility.

This fact has been proved at the El Segundo plant of the Douglas Aircraft Company where, in six months, 80 per cent of all of the employees at the plant voluntarily joined a recreational program of plantwide proportions.

Most plants have recreational programs of some kind. The programs may include interdepartmental games of softball, basketball, bowling, and the like. Golf tournaments may be arranged. There may also be gun clubs, camera clubs, and arrangements made for plant-wide athletic teams to participate in city or industrial leagues. But these sports and pastimes offer little attraction to Joe Doaks, grayish and fifty, assistant foreman in Department X, who has a family at home and a garden and fifty chickens to occupy his hours before and after work. At the same time, the nostalgic possessions are of little comfort to Joe during his eight-hour workaday grind. What Joe needs is a couple of lifts during the day to take his mind off of his work and to let him relax.

A recreational program featuring the sports and pastimes mentioned above was in operation at the Douglas El Segundo plant when Norman Amland, a Recreational Manager, was assigned to accelerate and enlarge recreational activities in order to accommodate the needs of a greater number of workmen. After-hour sports that demanded youth and vitality and an abundance of spare time were continued and enlarged. But the master stroke for those workers requiring a less strenuous on-the-job pastime was the inauguration of a game in which Jim Gwaltney, the plant's superintendent, promoted interest. The game is shuffleboard, which is played in the plant during the two 10-minute rest periods allowed on each shift and in which all may participate. Exceptional interest in the game was furthered by inviting employee participation in organizing it on a plant-wide basis.

Shuffleboard is far from new. It is a game which has been played aboard ships and in parks for many years. It does not demand athletic ability or physical exertion, and no uniforms are needed; it could actually be played by a cripple from a wheel chair. In order to excel, a player need only have a steady hand, fair vision, and good judgement. And yet, the game promotes teamwork and all of the competitive elements which Americans demand of a sport. It also provides for a high degree of spectator interest so

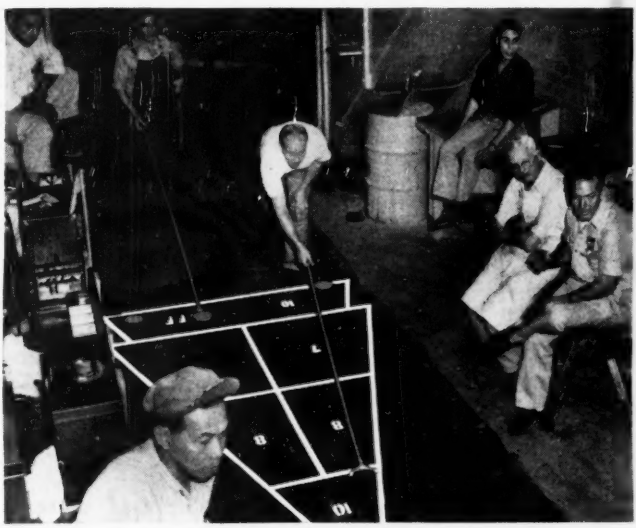


Fig. 2 — Close-up showing scoring triangle.

Fig. 3—Close-up of typical disc and end of cue used for shuffleboard.

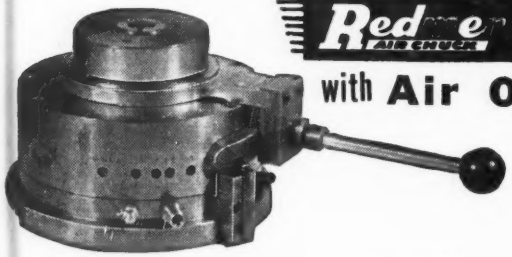
that spectators may identify themselves with the players and lose themselves in the good old American custom of rooting for a favorite.

The game loses much of its interest unless it is organized as an elimination tournament. At the El Segundo plant, the program is set up so that only four workers from a department may participate in the game during any one rest period. But other workers, knowing that their turns will come are interested in watching the games being played in order to appraise the skills of their future opponents.

In only six months after the inauguration of the game, 79 shuffleboard courts had been established in the plant. Since it is estimated that at least 50 spectators watch the contests at each of the courts, simple mathematical calculations will show that, during the two shifts worked, nearly 8,000 employees are momentarily diverted from job worries and given a chance to relax. Illustrated in Fig. 1 is a shuffleboard game in progress.

Small knots of employees gathered together during rest periods ostentatiously to enjoy the American privilege of "griping" are rare sights at the plant. "Loners", those peculiar individuals who hold themselves apart and aloof from all, are markedly reduced in number.

Shuffleboard courts may be installed



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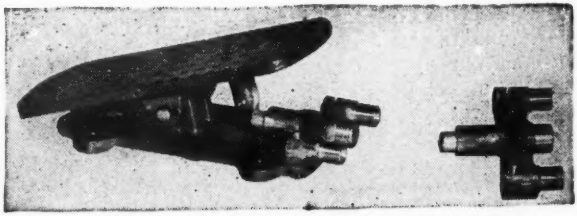

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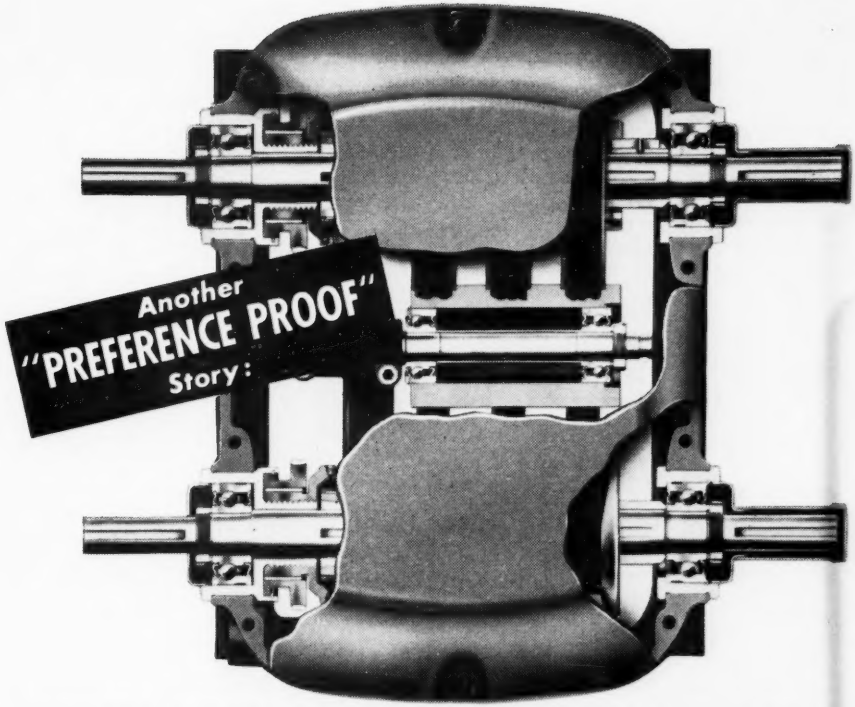

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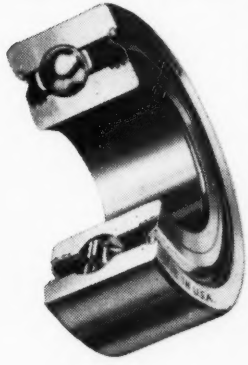

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in any factory or shop. At the El Segundo plant, the courts are 50 feet long and eight feet wide; they were laid out in the shop aisles by the Plant Engineering Department. The court size may be varied to meet the space available, but courts should be uniform within any one plant. A complete description of court layouts may be found on page 11, 4th revised edition of the Wilson Sporting Goods Company Athletic Field and Court Diagrams booklet.

Most of the courts at the El Segundo plant are on cement floors. An area in which a court was to be installed was first masked off and etched in order to clean and chemically deactivate the floor surface. A good grade of colored cement paint was then applied, followed by a sealing coat of clear paint. A master layout masking template was then used to paint the scoring triangles on the court, thus assuring uniformity. A close-up of one of these triangles may be seen in Fig. 2. Wood surface courts may be finished by using any good, long-wearing varnish.

All of the equipment required at all of the courts was fabricated in the factory's shops. Four cues and eight discs are needed at each court. The cues, which should be of light-weight material, approximately six feet long and pronged on the playing end, were made in the shop from dural (handles—dural tubing; prongs—cast dural). The discs, which are six inches in diameter and one inch thick, were fabricated from masonite. The discs were stained different colors in order to provide two sets of four discs each at each

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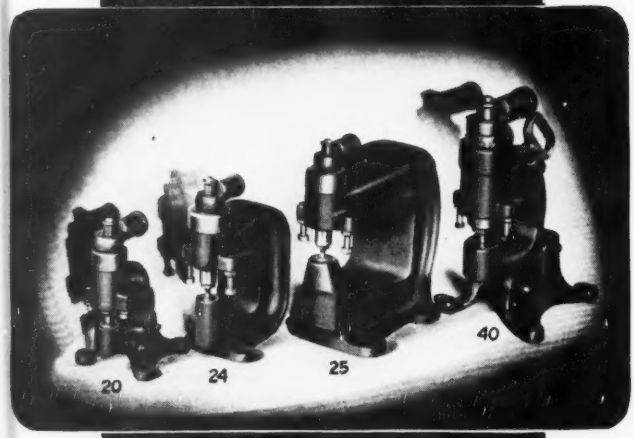

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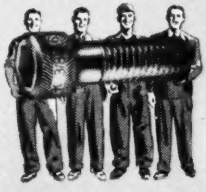

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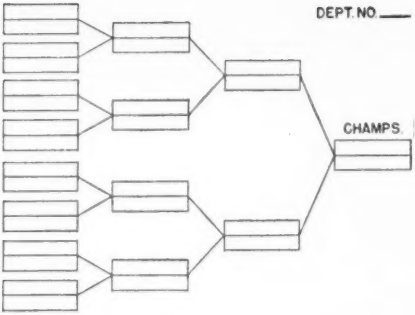

Fig. 4—Typical sheet used for tournaments.

court. A wall chart containing tear-off pages similar to bowling sheets was provided at each court, as were match set-up sheets. A typical shuffleboard disc and the end of a cue may be seen in Fig. 3. Shown in Fig. 4 is a typical sheet for a tournament.

The Recreation Manager points out that the rules governing the game may be modified easily in order to fit varying playing conditions, and also, in order to assure that both players and spectators return to their jobs on time. At El Segundo, the practice followed is to sound a warning whistle one minute before the end of each rest period. Games end with the sounding of this whistle with an additional evening-up disc being allowed if necessary. A copy of the rules used at the Douglas plant may be seen in Fig. 5.

Supervision of a shuffleboard tournament program is placed in the hands of a ten-man committee selected from among the employees. Supervision of departmental play is vested in a court clerk who is appointed on the basis of his popularity, inherent fairness, and interest in the game. It is the duty of the court clerk to inspire interest in the game and to see that all who wish to do so are given a chance to participate. None of the employees is urged to play, but all are invited.

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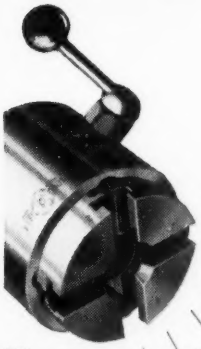

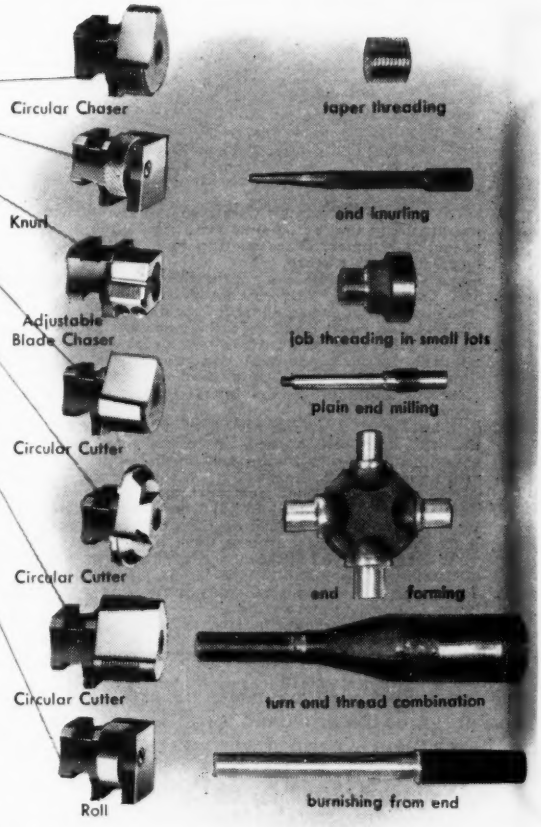

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Rules for Game of "Shuffleboard" as Played at Douglas Aircraft Company El Segundo Plant

1. Game is played by four (4) players with partners at opposite ends of the court.
2. Player making starting shot is determined by tossing coin. Loser shoots first. Shots are then alternated.
3. A frame is completed when four (4) discs of both colors have been served from one end of court.
4. Color of disc scoring most points in frame serves first in the return frame.
5. When no score is made in a frame, the team having the higher total score shoots first.
6. Discs are served from the "10 off" area and to the right or left of center line. Player serving is not allowed to cross back line of "10 off" area. Each player serves from his side of center line. Partners play from same side of center line.
7. A disc is out of play and is to be removed from within court boundaries when it fails to go beyond cross line nearest scoring triangle, or when it comes in contact with a disc which is out of play, or when it comes in contact with any object outside court boundaries.
8. Score is kept by adding points scored by each color of disc in one frame to the total points scored by each color of disc in the preceding frames. Discs scoring in "10 off" area are added to opposing team's score.
9. A disc touching any line of triangle does not score.
10. After each frame, players should call out points scored in that frame and total points scored. It is desirable to have a judge at each end of court and a score keeper.
11. Games played at rest periods will be of approximately nine (9) minutes duration and will end promptly at sound of warning signal for end of rest period. Games played at other times will consist of eight (8) frames unless they are ended by a warning signal.
12. In games ended by the sound of a warning signal, scoring in the last frame is counted up to the time the warning signal sounds, and a disc in the motion of being served at this time will be included in the scoring. Whenever this leaves an uneven number of discs served, one more disc is served.
13. Games played on the eight (8) frames basis which are cut short by a warning signal shall be considered a complete game if at least six (6) complete frames have been played. If six (6) complete frames have not been played, the game does not count in any respect.
14. No player or players shall play more than one game during a lunch period or before work.
15. Tie games do not count in any respect.

Fig. 5 — Shuffleboard rules used at the El Segundo plant.

The court clerk also maintains departmental game records and sees to it that each team is notified when its turn to play arrives.

Selections of team partners and turn-of-play are entirely democratic. Both are determined by drawings from a hat. This method prevents two good players from teaming up and "hogging" the show in any department, and it also gives a poor player a good chance to go a long way in tournament play if he is teamed with a good partner.

Two referees, one for each end of the court, and a scorekeeper are chosen for each tournament game. It has been found that arguments may be avoided by taking scoring decisions out of the hands of the players. This plan also adds to the number of employees who are participating actively in each game. In six months of play, only two court difficulties were brought to Amland's attention; these were settled quickly and to the satisfaction of all parties involved. "Standard court conditions and rules which leave no loopholes promote fair play and good fellowship," Amland says.

Except in special cases, only games played during rest periods are counted in tournament play. This provision gives all participants a chance to enjoy a lunch hour out-of-doors during nice weather and does not interfere with those who leave the plant to eat. Of course, there are no rules against using the courts during lunch hours for practice tilts or individual encounters.

Every departmental supervisor with whom the author spoke was enthusiastic over the shuffleboard program.

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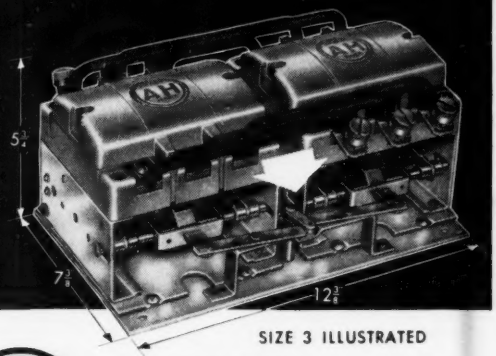

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Typical remarks which were given freely and with no prompting include the following: "It stops a lot of griping"; "I like the game and play it myself"; "My men get back to their machines quicker than they did before the game was started"; and "The fellows return to work relaxed and in good spirits".

Admittedly, there are a few employees who have failed to respond to the shuffleboard program. For them, other types of rest period entertainment are provided, though on a smaller scale. Some of the employees play cards, although gambling is not permitted. Rubber horseshoes and portable horseshoe stakes are provided for all who wish to use them; a quick tour of the plant during a rest period showed about 50 horseshoe games in progress.

The tremendous interest in shuffleboard has not detracted from other sports and activities at the Douglas El Segundo plant. An interdepartmental softball league is supported; both first and second shift golf tournaments are held, as is an Annual Golf Derby Day; and there are numerous bowling leagues for five-man teams on the first and second shifts and a mixed league of teams of four, two men and two women. Plans for expansion of the recreational program include the possibility of entering a plant basketball team in one of the Los Angeles metropolitan area leagues.

A company picnic for all employees, their families, and friends is an annual event; and interest in the picnic is stimulated by door prizes, free ice cream and balloons for the children, and

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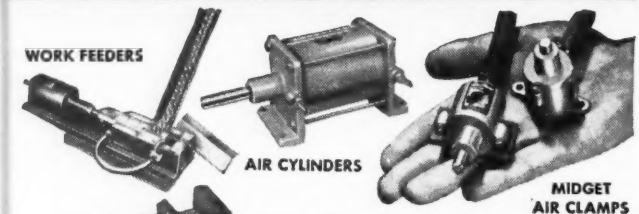

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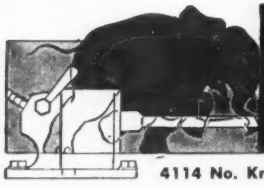

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by races, games, and other contests for which prizes are given. Another recreational attraction is a 16-set square dance class which meets each Tuesday evening at a local roller rink.

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(All photographs courtesy of the El Segundo plant at Douglas Aircraft Co.)

Standard Drill Bushings. The Universal Engineering Co., Frankenmuth, 9, Mich., has issued a 16-page catalog (No. B-1018) on A.S.A. standard drill jig bushings, locating pins and retainers, rest buttons, lock screws, clamps, and locating jigs. The catalog provides all necessary specifications, tolerances, and so on, of the various products in a concise and convenient manner. Included with the catalog is a net price list and condensed data sheet on the different items. Copy free on request.

Tools for Industry. The Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio, is distributing a four-page folder listing its various divisions and their products, which include grinding and polishing machines, special machinery shears, cranes, forging, threading and tapping machines, bolt, nut and rivet machinery, threading dies, shear blades, knives, and so on. Illustrations and brief descriptions of some of these products are presented. Copy free.

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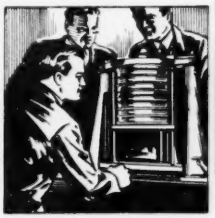

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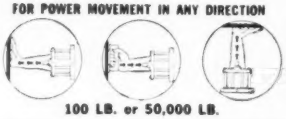

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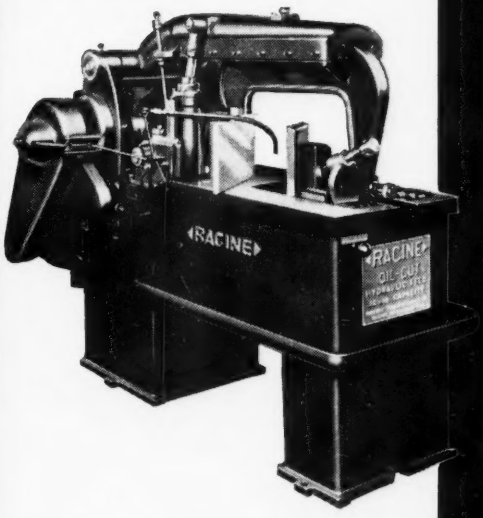

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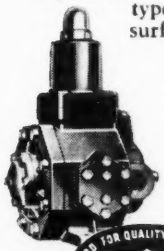

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Winding That Occasional Spring

By L. KASPER

IN THIS article, various simple methods of winding tension and compression springs will be discussed. These methods are presented especially for those shops which are occasionally called upon to make small quantities of springs.

As with the production of most products, the method of winding a spring is dependent upon the number of springs required and the equipment available. At this point, it might be well to clarify the difference between the terms "winding" and "coiling." The term "winding" is used to describe the method of forming a spring by which wire is wrapped around a mandrel; the term "coiling" is used to describe the method of forming a spring by which the wire is curled into the form of a helix without the use of a mandrel. Since the method of coiling requires the use of special machinery not readily available to the small producer, most springs made in small quantities are produced by winding.

Therefore, the method of winding a spring, although largely governed by the quantity required, is more frequently governed by the equipment available. For instance, to use a lathe, which might be used to better advantage on production work, would not be advisable if the required springs could be made with a small fixture. And, conversely, to produce a number of springs on a hand fixture, when they might be produced in a fraction of the time on an available lathe, would also be unwise.

A simple fixture for hand-winding springs is shown in Fig. 1. A piece of flat stock is bent into the form of a channel; and a series of holes, of appropriate sizes, is drilled in each leg, the holes in the legs being in line. A handle made of round stock is made for each pair of holes; and each handle is bent to the shape shown. A slit is cut in the straight end of the handle in which the wire is inserted and held; and the spring is formed as the handle is turned, the wire being guided with the free hand.

If a speed lathe is available, light tension springs may be made quickly by using a hand to guide the spring wire onto a rotating mandrel. This method is illustrated in Fig. 2; the

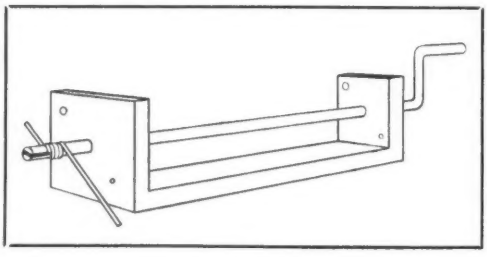

Fig. 1—A simple fixture for hand-winding springs.

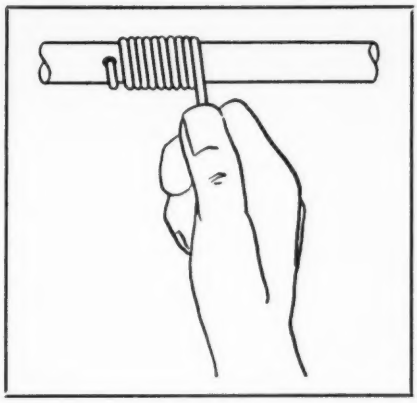

Fig. 2—Method of winding a tension spring onto the rotating mandrel of a speed lathe.

by using a hand to guide the spring wire onto a rotating mandrel. This method is illustrated in Fig. 2; the wire should be oiled slightly to prevent burning the fingers. A similar method may be used to produce compression springs, as shown in Fig. 3. Detail **A** shows a typical spacer which is used to space the coils; it is made of one or more coils of wire with one end left long for a hand grip. A few coils of the spring are wound, and then the spacer is placed between the last two coils as shown at detail **B.** The mandrel is rotated, and the spacer guides the wire onto the mandrel in uniformly spaced coils.

A simple hand tool which may be used for coiling springs in a speed lathe is shown in Fig. 4. This tool is simply a piece of flat stock in which two or more holes are drilled, and it permits applying some amount of pressure to the wire without injuring the fingers. The wire is threaded through the holes and fed onto the mandrel; pressure is applied by the thumb at the pressure point indicated. The illustration shows a tension spring being wound; the wire is threaded upward through hole **C,** downward through hole **D,** and onto the mandrel from above. The tool rides on the wire, its purpose being to maintain uniform tension. If a compression spring is required, the holes of the tool are drilled closer to the left side, the wire is threaded similarly through the tool, but it is fed onto the mandrel from the under side. In this case, the tool will ride on the mandrel and against the edge of the coil adjacent at the left, the distance of hole **D** from the left side of the tool serving as a spacing bar.

The tool shown in Fig. 5 may be found useful for winding a spring with initial tension. The tool consists of a piece of flat stock in which a hole, **E,** is drilled and through which a pin, **F,** is pressed. The wire is inserted through hole **E** from below, passed counterclockwise around pin **F,** and then fed onto the mandrel from above. Not only is there a considerable amount of tension applied to the wire as the wire is given a reverse bend around pin **F,** but this bending prior to coiling causes the coils to pack more closely together, thus providing initial tension for the spring.

The set-up shown in Fig. 6 may be

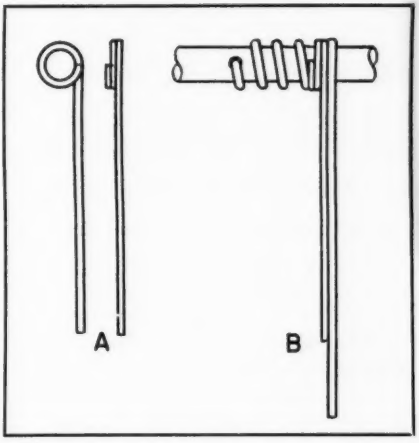

Fig. 3—A compression spring is wound onto the rotating mandrel of a speed lathe. Detail A is used as a spacer.

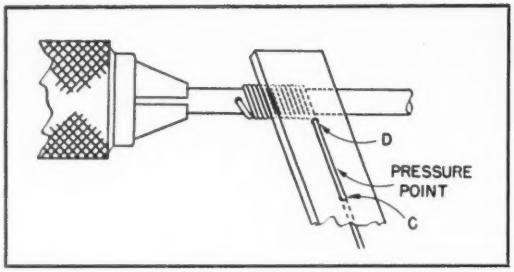

Fig. 4—A simple tool which may be used for winding springs onto the rotating mandrel of a speed lathe.

used for winding springs in an engine lathe. The tool consists of a brass bar, **G**, a grooved steel bar, **H**, and a brass insert, **I**. A concave surface is machined at the end of **G**, as shown at **J**, to fit the outside diameter of the spring being wound. Part **I** is designed to have a free fit in bar **H**, and a V-groove is machined on the under surface of **I** to guide the wire. A pin, **K**, at the rear of **I** prevents the part from sliding through the groove in **H**. A set screw, **L**, is provided through **H** for applying pressure to part **I** and, thus, to the wire.

As shown in Fig. 6, the tool is carried in the tool post of the lathe and is set at right angles to the axis of the mandrel, the compound slide being set parallel to the axis of the mandrel. For winding tension springs, the lead screw of the plate is set at a pitch which is slightly less than the pitch of the spring to be wound. The end of the wire is passed through a hole in the mandrel, a few coils are wound, and then the set screw, **L**, is adjusted to apply a heavy pressure to the wire and the cross slide is moved toward the mandrel until the concave surface in

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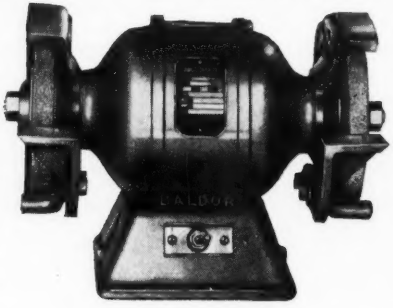

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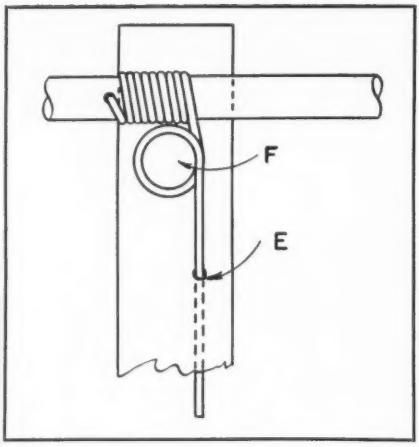

Fig. 5—A tool which is used for winding a spring with initial tension.

part **G** is pressed firmly against the coils. The purpose of this pressure is to burnish and stretch the outside coils of the wire so that the coils will be set tightly on the mandrel, thus controlling the outside diameter of the spring; if the pressure is sufficient, the spring will not expand when removed from the mandrel.

Since the pitch of the lead screw is set to be lower than that of the spring, the carriage will move at a slower speed than would ordinarily be required to wind the spring; and, therefore, as each coil is wound, there is a tendency for the wire to climb over the preceding coil. This is a desirable condition since it provides initial tension; but if the condition becomes too pronounced, the compound slide may be rotated slightly in the direction of travel. Compression springs are wound in a similar manner, with one exception; for compression screws, the lead screw is geared exactly, or as close as possible, to the pitch of the spring being wound.

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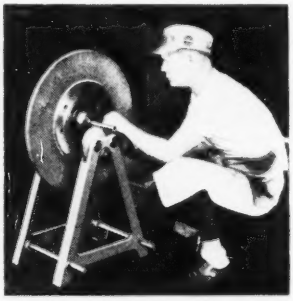

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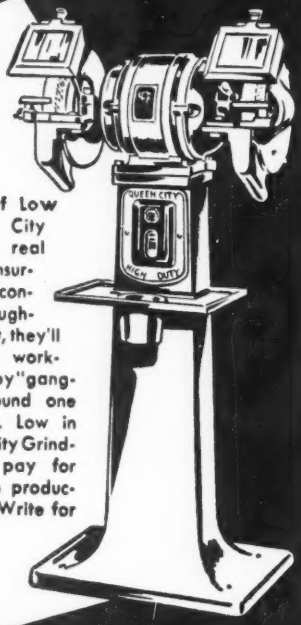

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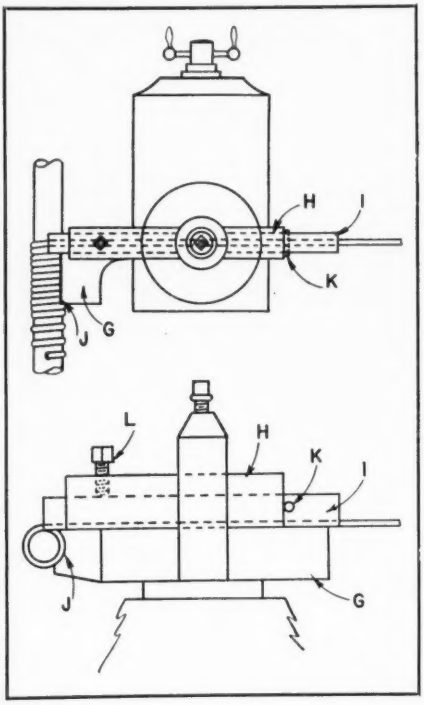

Fig. 6—A tool which is used for winding springs in an engine lathe.

upon the method of winding the spring. If the method illustrated in Fig. 6 is used, a mandrel is selected whose O.D. corresponds to the I.D. of the required spring since the spring is made to fit the mandrel tightly even after the wire is cut. For all other methods, however, a mandrel is selected whose O.D. is smaller than the re-

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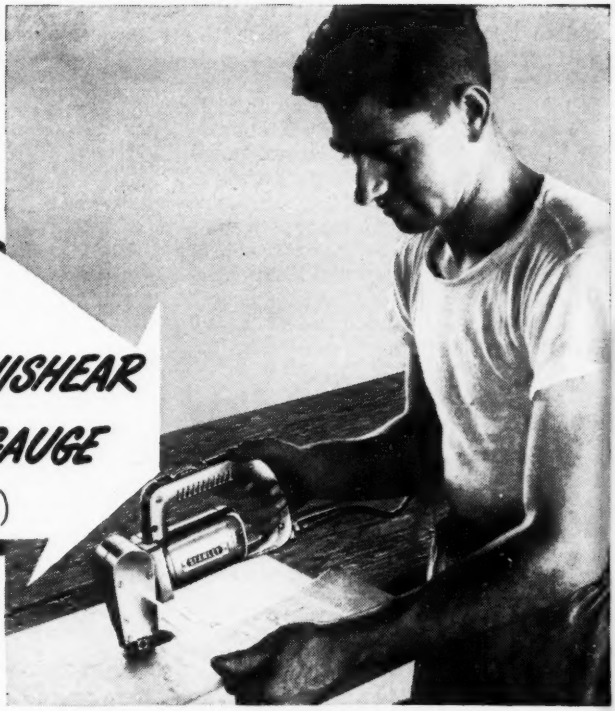

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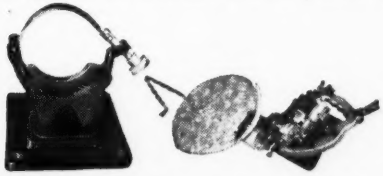

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quired I.D. of the spring since the spring will expand when the wire is cut. The exact size of mandrel for each job is determined by experimentation.

Regardless of the method followed to produce the spring, it is well to remember that the necessary cold working of the wire will tend to shorten the life of the spring and, therefore, that the spring should be given a subsequent tempering operation. The tempering process is especially important if the spring is wound under heavy tension or pressure.

"Tooling for Top Performance" is the title of a 48-page two-color bulletin (No. TP-44) published by The National Acme Co., 170 E. 134st St., Cleveland 8, Ohio, which is devoted to tooling practices actually employed on 44 different bar machine setups in plants of users of Acme-Gridley Multiple Spindle Automatics. For easy reference, the bulletin is arranged in sections in order to group combinations of tools and attachments which perform operations of the same or similar character. Copy free upon request.

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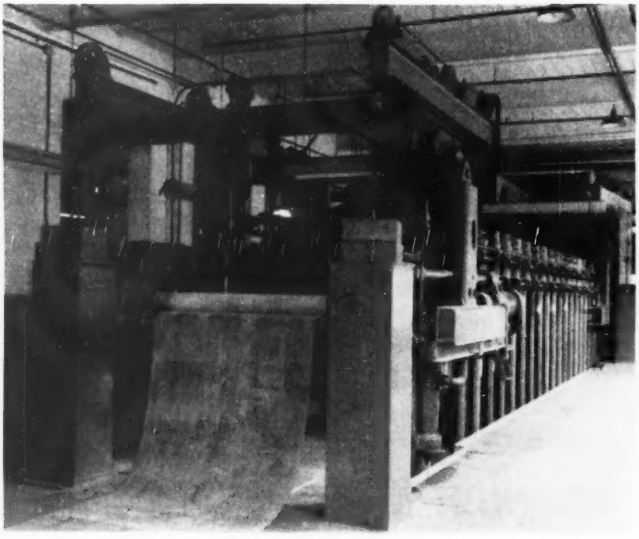
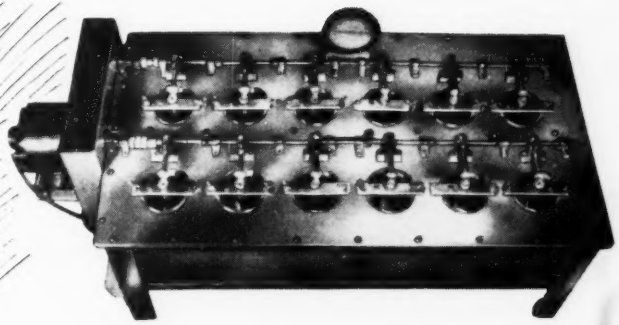
Air Valves. The Bellows Co., Dept. MMS, 222 W. Market St., Akron 9, Ohio, is distributing a 12-page bulletin (No. AV100) containing complete information on standard 2, 3, and 4-way air valves for the remote control of single and double-acting air cylinders or for incorporation in existing air systems.

World's Largest Precision Conveyor Belt Press



SHOWN herewith is a view of a 320-ton precision hydraulic conveyor belt press which has been placed in operation at the Passaic, N. J., factory of the Manhattan Rubber Division, Raybestos - Manhattan, Inc. This press, designed for use in vulcanizing conveyor belts which are used in mines and industry, is equipped with temperature controlled platens having a total surface area equal in size to that of a bowling alley. Manhattan Rubber engineers developed the system of temperature and pressure controls used on this press which provides for less than a two-degree variation in temperature over any one platen surface.



This stainless kettle makes a fine brew

Before your favorite lager is brewed, the malt is analyzed to determine quality and yield per ton. Heart of the testing equipment is this stainless "kettle"—a combined water heater—circulator that keeps the mash bath at required temperature. While gently stirring the samples for uniform suspension, this ingenious device automatically provides a temperature of 45°C . . . increases it 1° per minute up to 70°C and holds this maximum for an hour . . . cools to 25°C—then shuts itself off.

Stainless steel is used throughout, since even the slightest contamination makes a test worthless. Water is heated electrically, by elements encased in stainless tubing. The cups are spun stainless sheet, the top is stainless plate, and the agitator assembly is stainless bar. The machine also requires stainless strip, pipe, valves and pipe fittings—even the legs are stainless angles. Yet every bit of stainless used in this machine is obtained—overnight—from a nearby Frasse warehouse.

It's simpler, when you're working with stainless steels, to work from Frasse warehouse stocks. The wide range of forms and analyses, so quickly available from this nearby source, is a time and effort saving convenience. For stainless, call Frasse. *Peter A. Frasse and Co. Inc., 17 Grand Street, New York 13, N. Y. (Walker 5-2200) • 3911 Wissahickon Avenue, Philadelphia 29, Pa. (Baldwin 9-9900) • 50 Exchange Street, Buffalo 3, N. Y. (Washington 2000) • Jersey City • Syracuse • Hartford • Rochester • Baltimore.*

FRASSE for Stainless Steels and Tubing

BARS • SHEETS • STRIP • PLATES • TUBING • ANGLES
PIPE, VALVES AND FITTINGS • ELECTRODES

Schwarz Automatic Malt Mash Bath by
Schwarz Laboratories, Inc. Fabrication: Metropolitan Tool Works

NEW! **Stainless Mechanical Properties for Various Forms and Tempers**

This new Frasse data chart A-7 supplements the usual stainless property data with a wealth of additional detail. It shows typical properties—tensile, yield, hardness, etc.—of bars, strip, sheets, plates and wire *in various stages of cold working or heat treating.* Invaluable for careful selection of best stainless steel for your application. Send for a free copy today.

171

Peter A. Frasse and Co., Inc.
17 Grand Street, New York 13, N.Y.

Please send me a free copy of your new stainless steel mechanical properties data chart Sec. A, No. 7.

Name _____ **Title** _____

Firm _____

Address _____

STOP DUST MENACE WITH Hammond DUSKOLECTORS

DUST CONTROL
A MUST!

Progressive manufacturers, Production Managers and State Health Inspectors all agree that dust laden air

(1) Impairs employee health
(2) Reduces employee efficiency
(3) Ruins valuable machinery

MODEL 50 - 1 HP, 1000 CFM.

CYCLONE TYPE

½ HP, 1 HP, and 1½ HP.

Hammond DUSKOLECTORS will solve your dust problem. Recommended for tool grinding, general grinding and for polishing operations, etc., etc.

CABINET TYPE— ¼ HP, ½ HP, and 1 HP.

Write for folder and complete information.

Hammond of KALAMAZOO
GOOD MACHINERY SINCE '82

Hammond Machinery Builders INC.

1615 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

Know how to brighten your finishing picture...

how to bring down finishing costs?...

Rubber and abrasive, perfectly "balanced" in Brightboy, will really brighten your finishing picture. How? By working together. Simultaneously. The rubber "cushions" the abrasive; checks and softens too-rapid abrasive action. Result: You get BURRING, CLEANING, FINISHING, POLISHING, *in one operation!*

Brightboy gives you a fine-looking surface which often serves as the "final". Since you positively control Brightboy's action, you'll find Brightboy tops for fine-precision work. It can be shaped to contour, too.

You use Brightboy following the rough grind. It's so versatile that you'll find many applications. Test Brightboy in comparison with your present finishing materials and methods; discover how much time you can really save! See the innumerable surface patterns it will give you—a wide variety of damaskeening effects, for example.

Ask your dealer (or use the coupon) for the Brightboy Catalog-manual and prices of Brightboy wheels, sticks, blocks and rods, for machine and manual use without any time-taking preparation or dressing. Even unskilled labor can handle it! Query us on any problems which you feel require work-procedure suggestions.

BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Co., Newark 7, N. J.
America's Pioneer Manufacturers of Rubber-Bonded Abrasives

WELDON ROBERTS
Brightboy

Brightboy Industrial Division,
Weldon Roberts Rubber Co.,
Newark 7, N. J.

Send us the Brightboy Catalog-Manual and data.

Your Name _____

Firm _____

Address _____

Karl F. Kirchhofer

Sales Hints for the Smaller Shop

Benefits to be derived from contact with competent industrial advertising agencies

By KARL F. KIRCHHOFER

DESPITE the phenomenal growth of industrial advertising agencies during the past twenty years, there are still a considerable number of smaller metal working concerns which handle their own trade, business, and consumer advertising. Although it is natural for a small manufacturer of a highly technical product to believe that only he can promote the sale of his product as it should be promoted, there is no doubt in the writer's mind that the small manufacturer and everyone else can benefit and profit by employing the services of competent industrial advertising agencies.

True, the manufacturer may know his product inside and out. He may have babied it and nursed it through its growing pains. However, that does not necessarily mean that he possesses the know-how to put his product over to the public and to his trade. By combining the product knowledge of the manufacturer with the all-around experience of a well-versed advertising man, a combination may be obtained which is almost certain to give better promotional results.

A large number of industrial advertising agents today are engineers who know as much about metal working as many shop owners. The manufacturer benefits, when dealing with a good industrial advertising agent, by obtaining advice and experience which the agent has accumulated in his dealings with other manufacturers producing similar and/or different lines in the industrial field. This training and background of the agent are applied to the problems of the small manufacturer. These problems may be new and unique to the manufacturer, but they may very likely have been solved time and again by the agent.

There are many other good reasons which may be given for the use of an industrial advertising agent by a small advertiser; these reasons will be covered in subsequent articles. However, it would be well to mention here the jobs of copy writing and of advertising detail which are performed by the advertising man. The trained advertising man is adept at copy writing, and he is able to highlight unusual facts and conditions; it is almost impossible for one who is not trained to duplicate the skillful maneuvering with words that is second nature to a technician of language.

5 KVA SPOT WELDER and 120-AMPERE ARC WELDER in ONE Combination Unit

—both for considerably less than the usual cost of separate units!

DELTA "Dual Weld" COMBINATION WELDER

DELTA MILWAUKEE

With this *single machine*, you can spot weld, arc weld, braze, and solder! You can work on fine wire without burning or overheating — and spot weld up to 16-gauge steel on a production basis. You can change from one operation to another in a hurry.

This double-purpose unit costs much less than an individual 5 KVA spot welder and 120-ampere arc welder! That's due to Delta's unique design, careful engineering, and high-production methods.

In industry everywhere, low-cost Delta Milwaukee Machine Tools have long been recognized as the finest machines available. Now you can enjoy the same high Delta quality in welders.

Have your nearby Delta distributor show you this new Delta Combination Welder. Get a better idea of the many ways that you can use it profitably. Also see the new *Delta 5KVA Spot Welder and Delta 120-ampere Portable Arc Welder*. And ask about buying on easy, convenient time payments.

Send coupon for descriptive bulletin AD-453.

Look for the name of your Delta distributor under "Tools" in the classified section of your telephone directory.

POWER TOOL DIVISION
Rockwell Manufacturing Co.
Milwaukee 1, Wisconsin

No Other Welder Like It!

LOOK AT THESE FEATURES:

- One-piece Welding Horns
- Simple Contactor
- Wound Transformer Core
- Calibrated Current Scale
- 10" Throat Depth
- Double-Insulated Coil
- Full Spot Weld Pressure Adjustment.

Power Tool Division, Rockwell Mfg. Co.
602N E. Vienna Ave., Milwaukee 1, Wis.

Send me free bulletin AD-453 describing the new Delta welders.

Name_____
Title_____
Company_____
Address_____
City_____ (____) State_____

Some of the details in the advertising business include having cuts made, laying out ads, proof reading, maintaining records, and watching contracts. These details may prove to be very exasperating to a plant man whose time to devote to advertising is limited, but they are factors which are readily taken in stride by an industrial advertising agent.

Industrial agents, who handle very small accounts for which the billings are not large enough to warrant a fair return from commissions alone, generally charge small monthly service fees to the small advertisers. The payment of such a fee by a small advertiser will prove to be worthwhile in many ways, especially since it will assure professional handling of his sales promotional material.

There are many small plants which have done little or no advertising. The owners of these shops are unquestionably highly competent toolmakers and/or engineers, but they lack advertising experience. I should like to suggest to officials of all such small plants that, whether you have ever conducted advertising campaigns or not or whether you have any ideas of advertising at the present time or not, you call in good, sound, industrial advertising men to look into your problems. An advertising man may make suggestions and guide promotional material so that billings at a plant may be increased, for example, from $10,000 to $20,000 per month. All of this is possible and has been done in the past by

. . . . . HEVI DUTY HIGH TEMPERATURE FURNACE SOLVES A CRITICAL ENAMELING JOB

Type HDT 367236 Hevi Duty Furnace being used to fuse enamel at the Lorain Metal Treating Co., Lorain, Ohio.

World's largest bomber, the Consolidated Vultee B-36 can carry 10,000 pounds of bombs and 15-man crew for 10,000 miles.

LORAIN METAL TREATING COMPANY, LORAIN, OHIO fuses new ceramic coating on B-36 Heat Exchangers with outstanding success.

When the heat exchangers, used to de-ice wings and provide cabin heat against temperatures in excess of 70 below zero, proved to have a short service-life at extreme altitudes, Ceramic Engineers were consulted in an effort to provide a protective coating of a certain type of porcelain enamel. This coating was provided and fused to the metal in a Hevi Duty High Temperature Enameling Furnace.

This was an important and critical job, typical of many that have found their solution through the use of a Hevi Duty Furnace. If you have similar problems in heat treating, write for Bulletin HD-1046 and discover for yourself the many advantages of this type of Hevi Duty Furnace.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

means of properly conducted advertising campaigns. Look into this situation and call in a local industrial advertising man now.

Direct mail in itself is a vast subject. Volumes have been written about it, and additional volumes will continue to be written. Are you a steady and consistent user of direct mail? If not, you should be. I have used the mails for eighteen years, selling everything from newspaper subscriptions, advertising space, books, and directories to micrometers, milling machines, and microscopes. You too can use direct mail profitably; and, by citing certain case histories, I shall endeavor to pass on information which may be applied to your own business.

I do not know of any factor which is more basic in direct mail promotions than the use of the post card. Have you ever considered its possibilities? You would be amazed at the volume of business which may be booked by the continuous and judicious use of the standard post card. One outstanding success of the use of post cards for direct mail may be seen by citing the program followed by a company in the cutting tool field. This company uses post cards by the thousands to augment trade journal space advertising. Once each month, more than 10,000 simply mimeographed cards are sent out announcing bargains in cutting tools. The list of names was built up after many years of steady advertising in trade journals. Now the names on the list are frequently checked and rechecked; and the gold is being steadily

Kester Soldering FLUX

62 DIFFERENT FLUXES to meet Your Requirements

Kester makes a flux for every soldering operation because modern efficiency demands the correct flux for the job. Consult Kester's Technical Department on any flux problem.

Liquid Fluxes—Soldering Salts and Paste

Free—Technical Manual, "Solder and Soldering Technique"

1899 50th Anniversary 1949

KESTER SOLDER

KESTER SOLDER COMPANY
4201 Wrightwood Avenue, Chicago 39, Ill.
Factories also at
Newark, New Jersey • Brantford, Canada

Consistent Thread Accuracy

ANOTHER Reason Why the New and Finer "FORTY-NINER"

Gives You Better Tapping at Lower Cost

- √ Absolute Control of Thread Form
- √ Less Drive Power Needed
- √ Positive Control of Pitch Diameter

BESLY TAPS

UNSURPASSED ACCURACY

at *all* vital points

Microcentric CHAMFER
Micro finish, concentric to tenths of thousandths. Cuts freely and to size without burring or welding.

Solid Ground THREAD FORM
For angle and lead accuracy, elimination of gauging problems and control of pitch diameter to tenths of thousandths. Ground from the solid.

"Right" ROCKWELL
Taps pre-inspected for correct Rockwell hardness.

Mirror Finish FLUTES
Correctly designed to provide freer chip flow and longer tap life.

Tru-Square DRIVER
Square and shank fit correctly in chucks and holders, no wobble to cause oversize holes.

Just try this new Besly "FORTY-NINER" on a tough tapping job! See how thread follows through for perfect tapping results. That's because it's ground from the solid to a high degree of accuracy. Then, check these other points of thread superiority:

Accurate THREAD FORM—Absolute control of angles and lead eliminates gauging problems.

Superfine FINISH—High polish; less power required to drive the tap.

Consistent Precision in SIZE—Pitch diameter controlled to tenths of thousandth—tap to tap.

The Besly "FORTY-NINER" is produced by new manufacturing techniques and new machinery—much of which is *exclusive* with Besly. See for yourself what this can mean in better tapping and marked production savings. Ask your Besly distributor for a performance test in your plant now.

BESLY'S "HELPING HAND" HAS 5 STRONG FINGERS

- **Fast Delivery**
  —24 hrs. on high speed specials from hardened blanks;
  —3 weeks on bar stock specials.
- **A Complete Line**
- **Top Tap Quality**
- **Engineering Counsel**
- **Qualified Distributors**

THIS TRADE MARK IDENTIFIES THE WORLD'S MOST ACCURATE TAP

BESLY

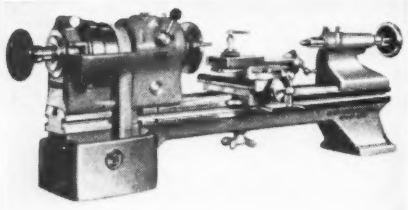
BESLY HIGH SPEED TWIST DRILLS AND REAMERS • BESLY TAPS
BESLY TITAN ABRASIVE WHEELS • BESLY GRINDERS AND ACCESSORIES

CHARLES H. BESLY & COMPANY, 118-124 N. Clinton St., Chicago 6, Illinois
FACTORY: Beloit, Wisconsin

SCHAUBLIN

SWISS MADE
SV 102 TOOLMAKERS LATHE • • •

- **ACCURATE!**
- **PRODUCTIVE!**
- **VERSATILE!**



A Precision Tool for Precision Work.

Here is a toolroom lathe for use where great accuracy of work is required. Tolerances are 20 to 30% closer than Schlessinger Standards — generally accepted as standard in the testing of machine tools.

Available attachments and accessories make this a productive and versatile addition to your toolroom.

Write for complete data on the Schaublin SV 102 toolmakers lathe and other Schaublin lathes.

SCHAUBLIN DIVISION

HAUSER

MACHINE TOOL CORP.

MANHASSET, N.Y.

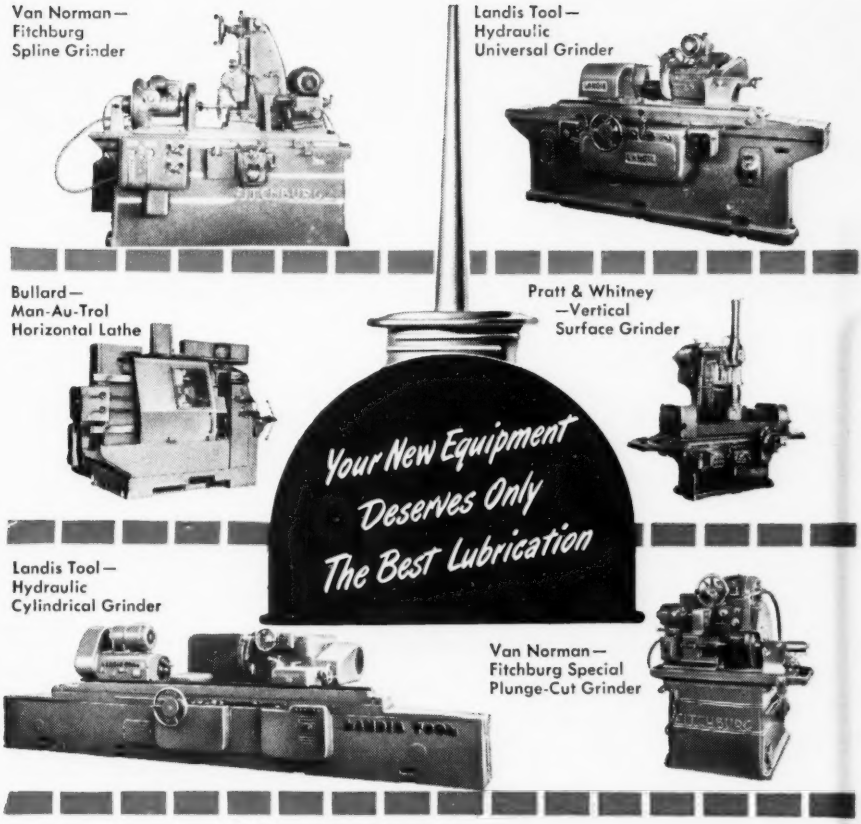
mined in the way of profitable, easy-to-handle mail orders.

Another example may be seen in the case of a small machine shop owner who recently mailed out 5,000 inexpensively printed post cards to a general list of names taken from the classified pages of the telephone directory in his city. He simply listed the equipment and the facilities of his shop and stated frankly that he was looking for work. He received only one inquiry. At first glance, or even at second, this would seem to be an extremely poor response. However, that one reply resulted in an order for $1600 worth of milling work, and dollar-wise it meant a good return on an investment of a little more than a hundred dollars. In addition to showing an actual and immediate profit on the direct mail promotion piece, this small machine shop owner received all of the additional advertising free; and some day, some week, or some month, others who received the cards and filed them away for future reference will no doubt consult him when they are in need of his type of services.

Geared-Head Lathes. Two two-color catalogs illustrating and describing Sebastian Standard Type "R" Lathes (Catalog S-1) and Sebastian Special Type "R" Lathes (Catalog S-101) have been issued by American Steel Foundries, King Machine Tool Division, Cincinnati 29, Ohio. Both catalogs include complete specifications. Copy free.

Form-Grinding Service. The J & S Tool Co., Inc., 475 Main St., East Orange, N. J., has published a four-page folder illustrating and describing its facilities for producing special high speed steel and carbide tools to specifications. Illustrations and descriptions of typical types of tools produced are also included.

Power Shears for light sheet metal are shown, described, and listed as to specifications in a four-page three-color bulletin (No. 71-1) released by the Niagara Machine & Tool Works, Buffalo 11, New York. Copy free upon request.



Get Skilled Cities Service Lubrication From the Start

Investigate the advantages to be gained by using Cities Service fine quality petroleum products. Whatever the machine or service you'll find the right lubricant for your particular requirements. Cities Service Lubrication Specialist will provide sound recommendations on any kind of lubrication problem.

FREE . . . New Fact-Filled Booklet For The Metal Machining Industry

Cities Service Oil Company
Sixty Wall Tower, Room 528
New York 5, N. Y.

Please send me without obligation your new booklet on "Metal Cutting Fluids."

NAME_____

COMPANY_____

ADDRESS_____

CITY_____ STATE_____

CITIES SERVICE

Looking for Lower

In Many Plants they have Found

Have you tried the convenient, light-weight wear-resistant NORBIDE Dressing Stick? Made of the hardest material produced by man. They are extremely popular in tool rooms for wheels 10" and smaller — especially cup and saucer shapes.

IT'S in the field of surface grinding that 32 ALUNDUM abrasive has its very widest application. In fact the grinding wheel supervisor of one of the country's biggest plants says of "32", "The best wheel there is for all kinds of surface grinding. We won't consider anything else." Yes, in straight wheels for small surface grinders, in straight wheels for large surface grinders, in cylinders and segments for vertical spindle surface grinders 32 ALUNDUM abrasive is showing remarkable savings.

It removes metal *faster* — taking deep cuts without burning. That's because the greater purity of "32" gives the grains greater point endurance—they stay sharp longer. And the nubbly surface of the grains gives more room between points—greater chip clearance.

NORTON COMPANY
WORCESTER 6, MASS.
Distributors in All Principal Cities
Consult Your
Classified Telephone Directory

Grinding Costs?

32 ALUNDUM Abrasive the Answer

TOOL room grinding is another outstanding field for "32". It quickly and *safely* resharpens all kinds of high speed steels including the new, special, high vanadium types and cast alloy tool materials. Because the grains of "32" are so sharp they penetrate these materials easily and cut free and cool. Thus they give *extra safety* to the grinding of expensive dies and tools.

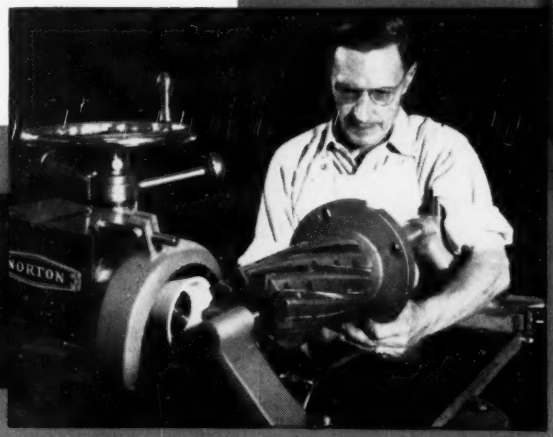
And because "32" wheels *stay sharp*, frequent dressings are unnecessary. This means a big saving in time in grinding large multi-tooth cutters because the wheels hold size all the way around.

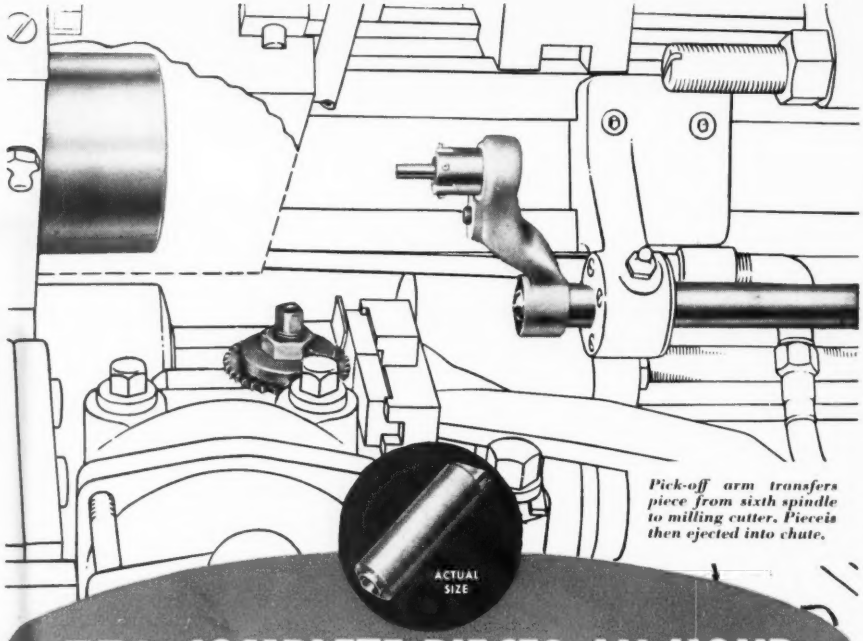
If you haven't tried 32 ALUNDUM wheels for your surface and tool arindina iobs, you may be missing a real chance to cut grinding costs.

And Here's Why

It's produced differently by a Norton-invented and Norton-patented process. Each grain of 32 ALUNDUM abrasive is formed in the electric furnace as a *single complete crystal*. Each crystal is formed with many sharp points on *all sides*, no matter how they are bonded into a wheel one or more cutting points are exposed for faster, cooler cutting. Each grain is over 99% pure fused alumina—more usable abrasive for greater resistance to dulling.

NORTON
ABRASIVES





Pick-off arm transfers piece from sixth spindle to milling cutter. Piece is then ejected into chute.

770 COMPLETE PIECES AN HOUR

Formed, drilled, tapped and milled on a Model 60

New Britain Automatic

Pick-off and transfer to milling attachment in sixth position makes it possible to drop off this complete piece in one operation, thereby holding down the cost of a highly competitive assembly. Because of the quantity involved, the close tolerances and the size of the piece, a second operation is out of the question.

Special machine performance on a general purpose machine with rigidity and accessibility means double protection of your machine tool investment.

549HD2

To see other types of work done on New Britains, send for our brochure of actual cost histories on money making production.

NEW BRITAIN

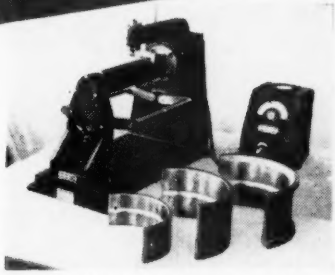
Automatics

THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN-GRIDLEY MACHINE DIVISION
NEW BRITAIN, CONNECTICUT

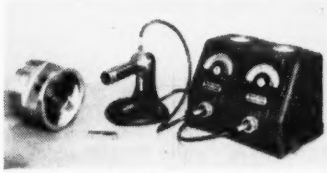
Measure Without Mechanical Contact

Checking a tapered part for diameter and runout with a Taft-Peirce Duplex Unit CompAIRator.

...with the TAFT-PEIRCE CompAIRator



Checking 8½" diam. Bearing Liners for wall thickness.



Checking Piston Pin Holes for alignment.

AIR AGE SPEED • Minute streams of controlled air do the measuring when you use a Taft-Peirce CompAIRator. Neither mechanical contact points nor exact work positioning are required to check a part. As a result, individual measurements can be made with unusual speed—over-all inspection time is reduced drastically.

NO SKILL REQUIRED • Since it eliminates the need for human skill and feel, even an unskilled inspector can obtain reliable and exact measurements.

CONSISTENTLY ACCURATE • Accuracy is constant and instantaneous. What's more, vibration, shocks, and long extension tubes will not introduce errors—nor will oil deposit or coolant-flow over the work surfaces interfere, when gaging at the machine.

A MIDGET IN SIZE • Everything needed, save the gaging members and extension tubes, is in one small cabinet, only 7" wide, 8" high, 7½" deep (Single Dial Unit). Additional filters and regulators are not needed. Write *today!*

THE TAFT-PEIRCE MANUFACTURING CO.
Woonsocket, Rhode Island

Please send me further information on the T-P CompAIRator. I would like ( ) Literature, ( ) Information, ( ) Representative to call regarding application to measurement of the parts described in the attached letter.

Name_____ Title_____

Company_____

Street_____ City_____ State_____

Induction Hardening, Part III

Miscellaneous applications and techniques commonly used for selective hardening

By Frank W. Curtis

INDUCTION hardening, while used broadly for many industrial applications, is a selective method in the hardening field; and by no means is it intended to supersede other methods of hardening. Often, difficult operations may be performed quite easily by means of induction; and occasionally induction heating may be used to perform operations which could not be handled in any other way. Before adapting a method of induction hardening to a specific situation, it would be well to know its scope of applications and to determine if the advantages of the process, which have already been covered, justify an installation. In other words, will the use of induction hardening result in a better job and a better product.

The production obtained from an induction hardening unit is determined largely by the type of tooling used—the coils, feeding devices and fixtures, and quenching arrangements. While it is important to have a knowledge of electrical and metallurgical considerations in determining results of an operation, the most important factors of an operation are usually those of a mechanical nature. For some hardening operations, the fixtures used may be relatively simple, requiring that only studs be used for the centralization of the workpieces within the coils and the quench rings. On the other hand, where parts are produced in large quantities, highly-mechanized fixtures may

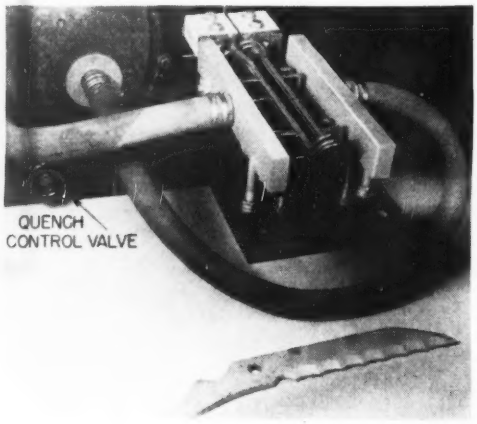


Fig. 1—Hedge cutter blades, which are used with motor-driven trimmers, are induction hardened selectively along their cutting edges by being inserted into a three-turn feed-through type coil.

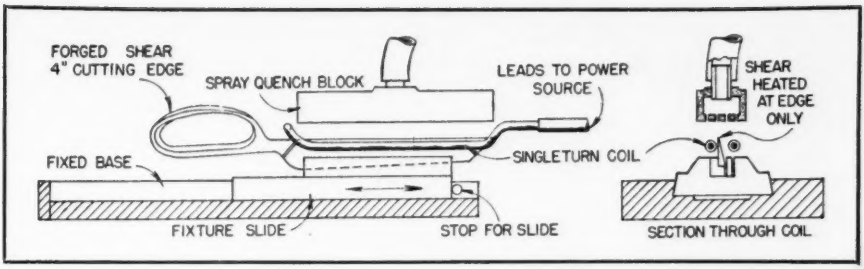


Fig. 2—Illustration showing setup having a sliding-type fixture which is arranged to hold a single workpiece.

be required. The basic problem is that of tying together the coils with the fixtures or other mechanical devices so that transfer of electrical energy takes place with a minimum amount of losses.

Basic tool design principles are applied in a similar manner to induction hardening units as they are to other mechanisms. One big difference in design which exists, however, is that of keeping metal parts a sufficient distance away from the coils so that they do not extract energy which should be transferred to the workpieces. The use of metal fixture parts within a coil should always be avoided if at all possible; and, also, metal parts should be spaced at least two inches, or more, away from the outside of a coil. In cases where metal parts must be used, it is preferable to consider the use of non-ferrous materials such as brass or copper which absorb heat more slowly than do the ferrous metals. All of the screws used in induction hardening fixtures should be made of brass.

Non-metallic materials, such as asbestos board and many types of plastics, may be used satisfactorly for many fixture parts. These non-metallic materials are particularly suitable for holding devices, being used either exclusively for a device or in combination with other materials. The

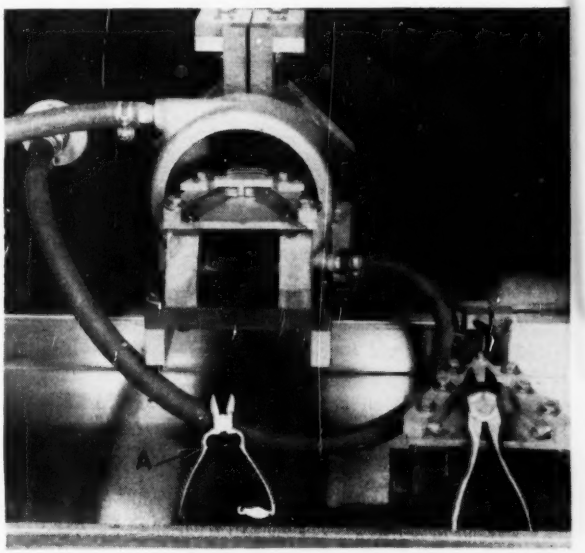


Fig. 3—Illustration showing setup for induction hardening of pedicuring tools and cutting pliers.

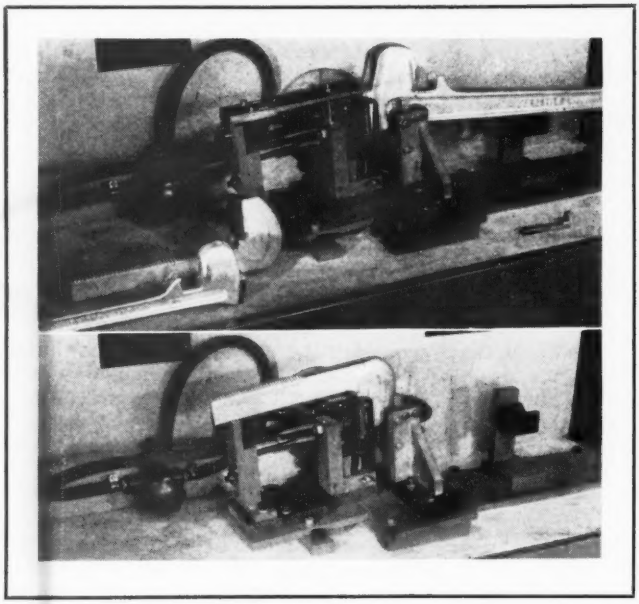


Fig. 4 — A universal-type fixture used for hardening the jaws of pipe wrench. Upper view shows a wrench handle in the heating and quenching position. Lower view shows an upper jaw in position.

cost of non-metallic materials is comparatively lower than that of metal parts, and they have an additional advantage of being easier to fabricate. Asbestos board, such as Transite, is comparatively hard; its resistance to wear is sufficient to make its use practical; and it may be used successfully at relatively high temperatures. Asbestos board parts which do become worn may, as a rule, be replaced conveniently.

Hedge cutter blades, which are used with motor-driven trimmers, are induction hardened selectively along their cutting edges by being inserted into a three-turn feed-through type coil, as illustrated in Fig. 1. Located on both sides of the coil are rectangular-shaped spray quench blocks which provide sprays of water to the heated areas of the work. The operation consists of heating a blade to 1550 deg. F. in 7 seconds, having the power cut off by means of an automatic timer control, and spray quenching for 6 seconds. The coil is supported on a plastic plate by means of several studs which are brazed to outer surfaces of the coils, thus assuring rigid mount-

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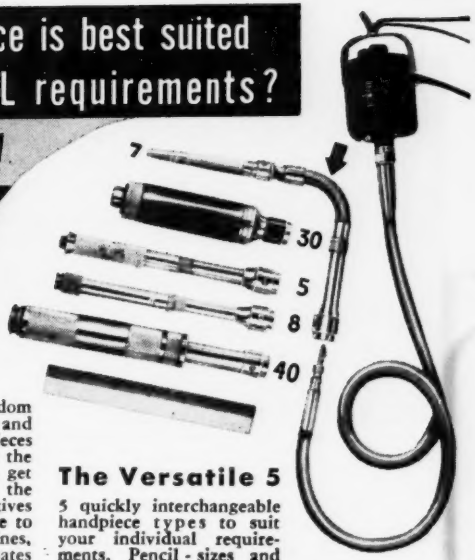

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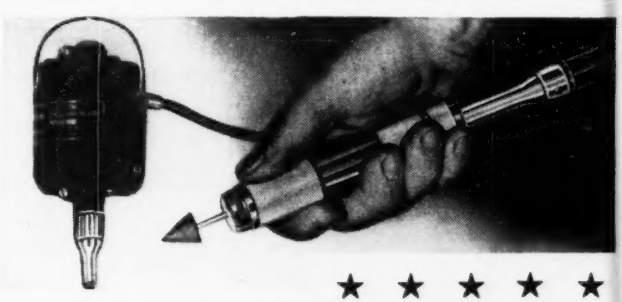

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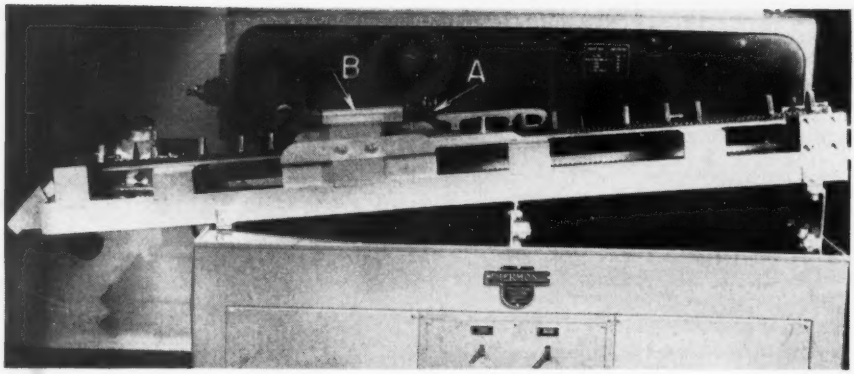

Fig. 5—View of a unit having a typical progressive feeding unit.

ing. The two quench blocks are also supported on the plastic plate.

Since high-frequency currents travel essentially on the inside surfaces of a coil, it is possible to provide supports, braces, and suitable mountings on the outside surfaces of a coil without affecting efficiency or the current paths. It is obvious that supports of this type provide a rigid means of mounting a coil, which might otherwise be mounted in a somewhat

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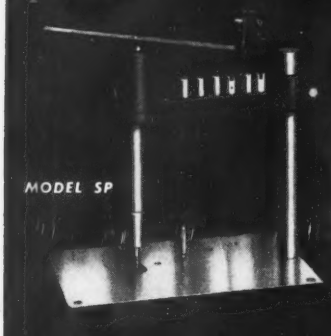

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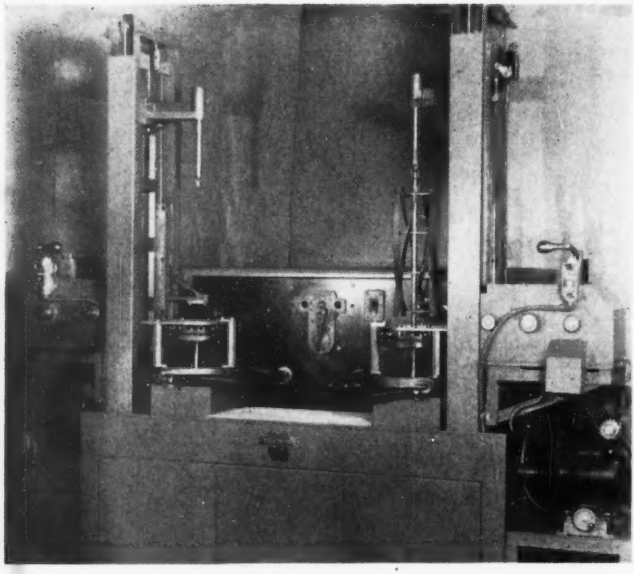

Fig. 6 — Illustration showing a setup for progressively hardening lawnmower reel assemblies.

flimsy manner. The materials used for these braces and for the nuts which are used to hold them to the baseplates should always be either brass or copper. At no time should any small portion of a support extend within a coil, as it would then alter the course of the current.

Shear blades may be inductively hardened in a similar manner, as illustrated in Fig. 2. The setup includes a sliding-type fixture which is arranged to hold a single workpiece. After a blade is loaded, it is advanced into the heating and quenching position. By substituting different types of slides, shears of various sizes may be accommodated. Oil or water sprays may be used as required since separate control valves are provided. When an oil spray is used, the oil is circulated through a heat exchanger and re-used. The heating time for a shear such as the one shown is three seconds, and the spraying time is four seconds. The cycle of heating and quenching is started automatically when the slide is advanced to position a workpiece in the coil. A single-turn coil is used for heating; and a rectangular-shaped quench block, which is located directly above it, is used to supply the spray.

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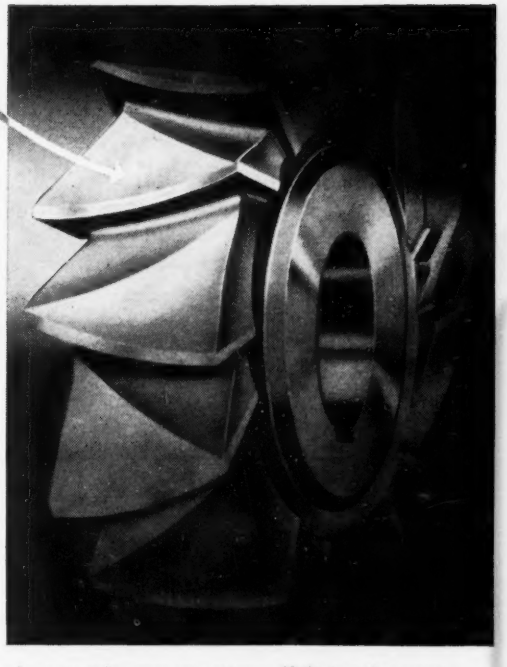

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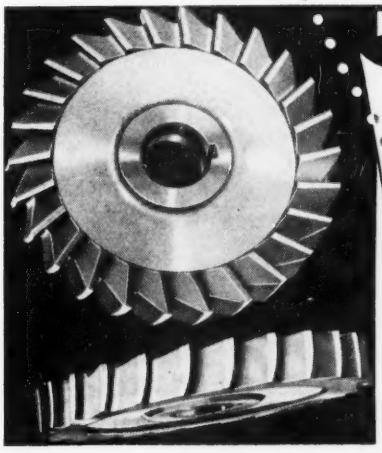

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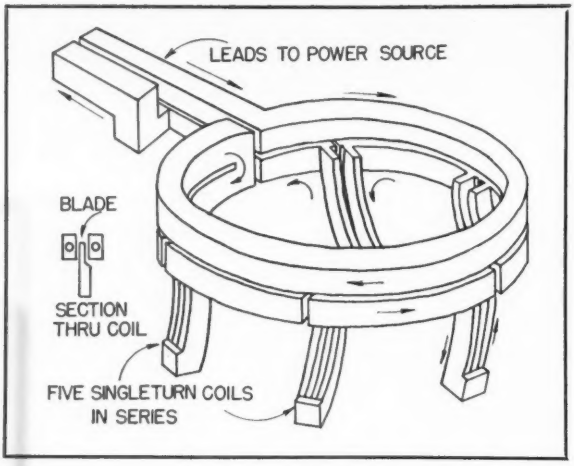
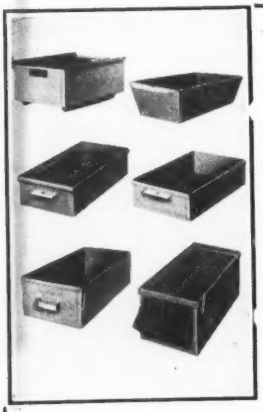


Fig. 7—Drawing illustrating principles involved in progressively hardening lawnmower reel assemblies.

hardening of pedicuring tools and cutting pliers, as illustrated in Fig. 3, uses a spray-quench ring, arranged vertically, in which the heating coil and the locating fixture are positioned. The pedicuring tools, such as the one shown at **A**, are placed in a multiturn coil and heated and quenched in six seconds. The cutting pliers, shown at the right in Fig. 3 are hardened in a similar manner, using a fixture which is interchangeable with the one shown in the quench ring. These parts are hardened after the two sections of the parts are assembled, a change in practice which is made possible by the use of the induction hardening process. Heretofore, each



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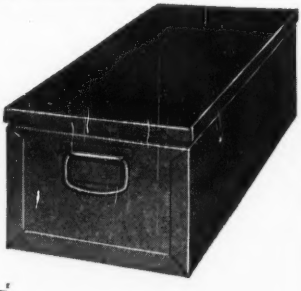

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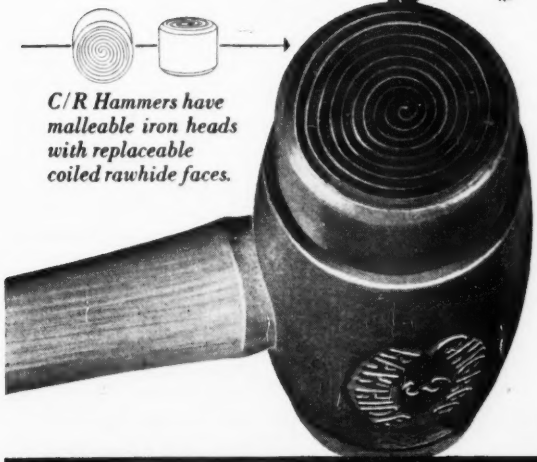

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section was hardened separately, and then the sections were assembled.

Shown in Fig. 4 is a universal-type fixture used for hardening the jaws of pipe-wrench parts. The upper view shows a wrench handle in the heating and quenching position, and the lower view shows an upper jaw in the position in which it is treated. These wrench members are made of magnesium which is cast around steel jaw inserts, a means of construction which is particularly suited to induction hardening since heating is limited to the faces of the jaws only. The coil used is of the pancake or "butterfly" type, and it is used in conjunction with a spray quench which is adjusted by means of a valve shown at the left. By using different fixture components and interchangeable coils, wrench parts of different sizes may be accommodated. Heating times vary from 15 to 30 seconds and are dependent upon the wrench sizes.

A unit having a typical progressive feeding arrangement is shown in Fig. 5. The edges of ice skate blades are hardened in this unit which is made up of a chain-type conveyor, provided with locating blocks to align and hold the blades in a vertical position; a single-turn induction coil **A** of the feed-through type; and a spray-quench tube **B.** As a blade is fed through the coil, its running edge is heated progressively, following which the heated area is passed under an oil spray. A hood which is not shown in the illustration, and an exhaust fan are used to carry off the fumes; and the oil is recirculated through a

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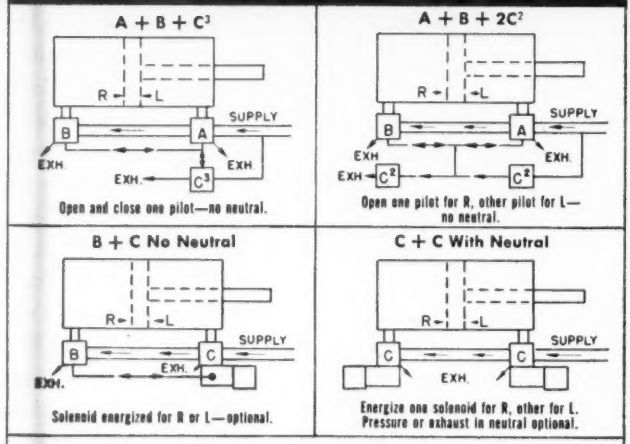

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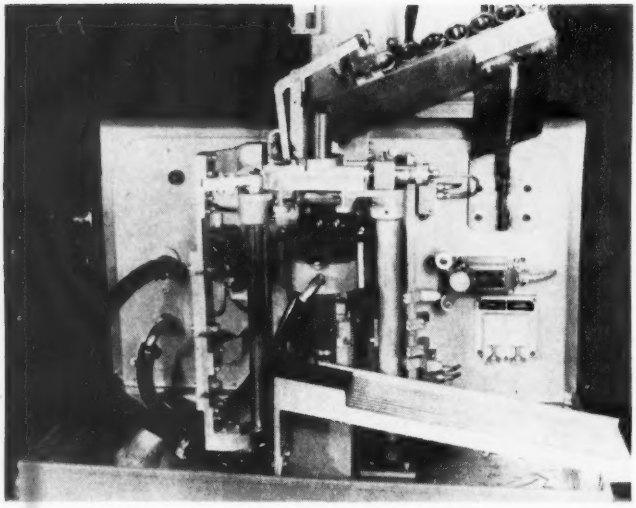

Fig. 8 — Illustration showing a progressive setup for hardening six inch lengths of steel tubing.

heat exchanger in order to control its temperature. The hardened skate blades are dropped off of the conveyor at the left end of the unit so that the duties of the operator are only those of loading.

The work locating blocks are provided with interchangeable studs and are arranged to accommodate various lengths and sizes of skate blades. The conveyor table is used with a 20 Kw. output generator, and the production rate obtained varies from 300 to 500 parts per hour, depending upon the size and thickness of the blades. After hardening, the blades are clean and free from scale, thus simplifying their preparation for plating.

Illustrated in Fig. 6 is a setup for progressively hardening lawnmower reel assemblies. Previously, the blades were hardened before assembly, with the result that they were distorted considerably due to their thin shape and size. The distortion caused a considerable amount of difficulty in assembling the reels to the spacers. By using the induction hardening method, formed blades now are assembled to spacers in a "soft" condition, and then the blades are progressively hardened simultaneously, as shown. An assembled reel is located on centers, mounted on a vertically-operated slide, and then fed downward through a series-type coil and a spray water quench. The heating cycle required for a reel such as the one shown is 28 seconds.

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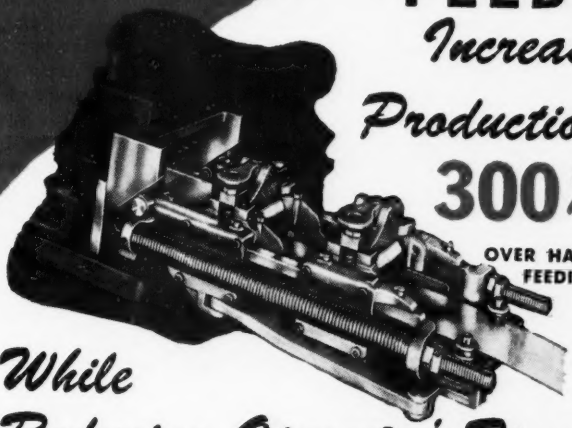

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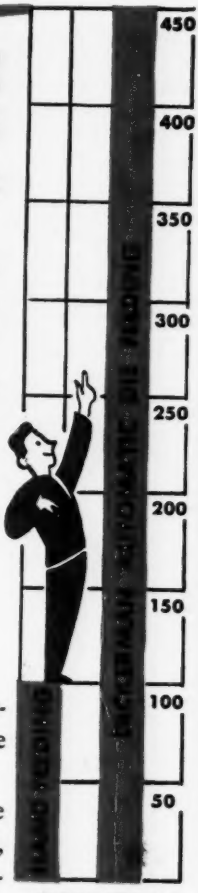

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Details of these principles are illustrated in Fig. 7. Arrows are used to show the flow of current from one lead around the upper loop and the reversed flow in the lower ring. The lower ring is slotted and coils are attached to this ring as may be required. Without a cancellation arrangement of this kind, inductance losses in the center would be excessive; and the entire reel assembly would be heated rather than having the heat confined to the outer areas of the blades.

In Fig. 8 is shown a progressive set-up for hardening six-inch lengths of steel tubing. A hopper is used to position the parts in the workcoil. The feeding of the work is accomplished by means of an air-operated plunger with which one piece at a time is pickled up and carried downward through the coil and the spray quench ring. At the bottom of the stroke the hard-

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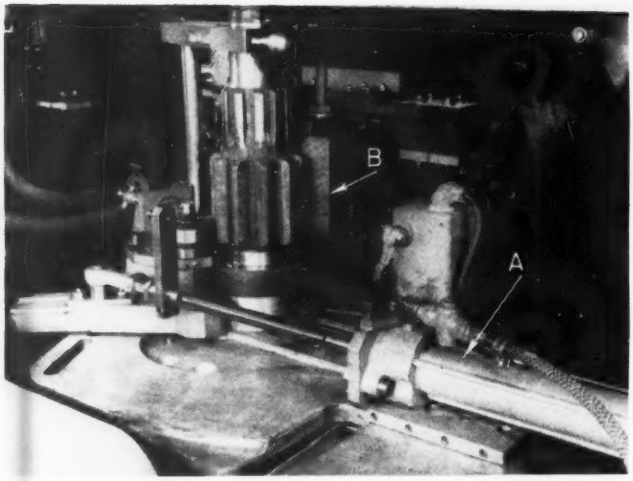

Fig. 9—View of automatic indexing fixture used for heating and quenching teeth of large gears, one tooth at a time.

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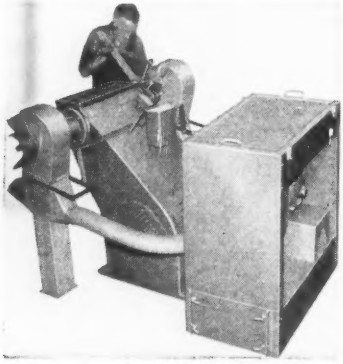

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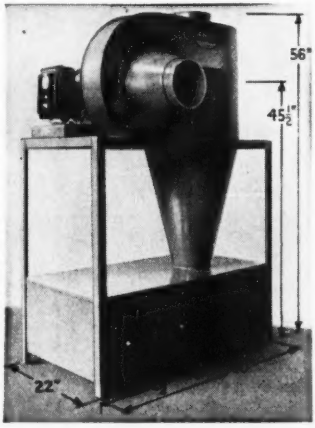

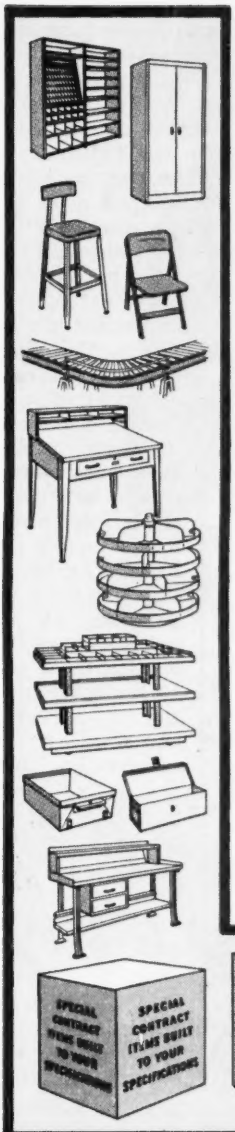

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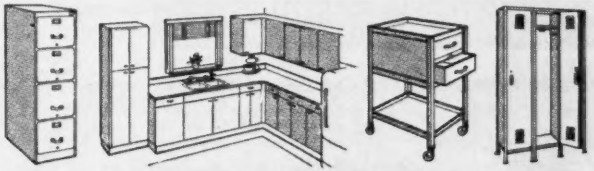

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advisable to consider the possibility of heating and quenching the teeth individually. Such a procedure makes it possible to use a smaller generator than would ordinarily be required for the processing of large parts and one which is considerably less expensive. Also, it is often possible to harden the teeth of large gears by a tooth-by-tooth process when it would be difficult to harden these teeth by any other method.

An automatic indexing fixture used for heating and quenching teeth of large gears, one tooth at a time, is illustrated in Fig. 9. The operator places a gear in position in an adaptor on the fixture with the fixture in a retracted position. The start button is then pressed, and the piston of air cylinder **A** is moved forward with a ratchet dog turning the gear until the dog comes to a stop. The gear is now indexed in position. With further movement of the piston, the slide assembly is carried forward, placing a tooth of the gear in the coil. Subsequently the generator is energized automatically and the tooth is heated to the proper temperature. At the completion of the heating cycle, the air cylinder piston is retracted and the carriage reversed so that the heated tooth is withdrawn from the coil. The air cylinder piston is then moved forward again and the gear indexed so that the heated tooth is carried into the spray from the quench block **B** and, at the same time, another tooth is moved into the coil for heating. This operation is continued until all of

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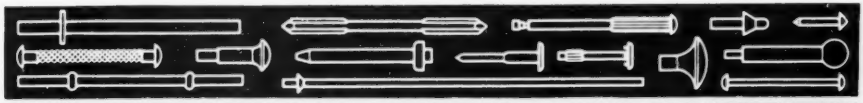

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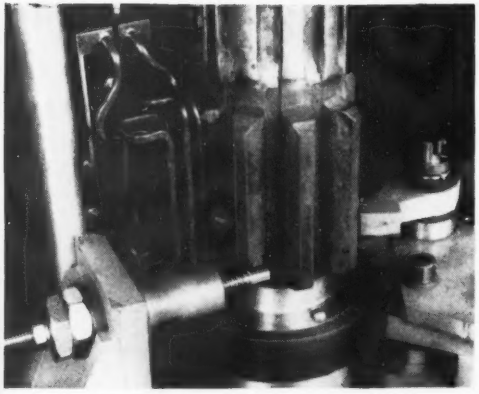

Fig. 10—Close-up view of gear and coil.

the teeth on the gear have been heated and quenched. The gear is then removed from the fixture and another one installed in its place.

A closeup view of the gear and the coil used is shown in Fig. 10. The fixture is designed to accommodate teeth on gears up to 14 inches in diameter, and interchangeable coils are provided for various tooth forms and lengths. In this view the gear is shown withdrawn from the coil and about to be indexed by the air cylinder.

The fixtures which have been described are representative of designs which may be applied to a variety of induction hardening operations. In order to apply induction hardening methods to the best advantage, knowledge of mechanical needs, which largely involve fixture design, is required.

The photographs used in this article were supplied by the Induction Heating Corp., for which the author expresses his appreciation.

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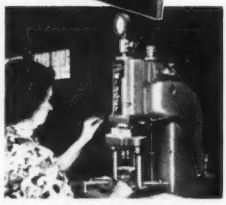

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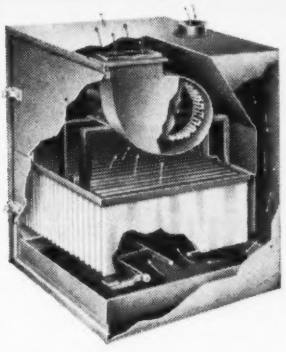

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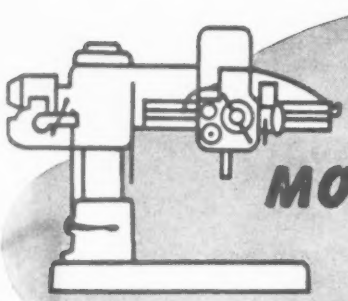


MODERN EQUIPMENT AT WORK

Wirebound Crates Solve Packing Problem

IN the Dewalt, Inc. plant at Lancaster, Pa., modern methods of packing for shipment are now being used to combat rising freight costs, excessive packing expense, and damage in shipping. Formerly, power saws which were produced at the plant were shipped in crates which were also made at the plant. A considerable amount of factory space was required for the crate-making department; there was always a certain amount of lumber wasted in making the "home-made" crates; and the safe arrival of the shipments was not always assured.

Because of these disadvantages, and because of the many advantages of the new method, the company decided to change to the use of wirebound crates which are specially designed and built for most of the different models of Dewalt cutting tools. As a result of the change in crating methods, a typical crate tare weight was reduced from 205 to 160 lb., or 20 per cent; shipping weight was reduced from 820 to 775 lb., or about six per cent; and the time required for crating was reduced 30 per cent. Also, shipping

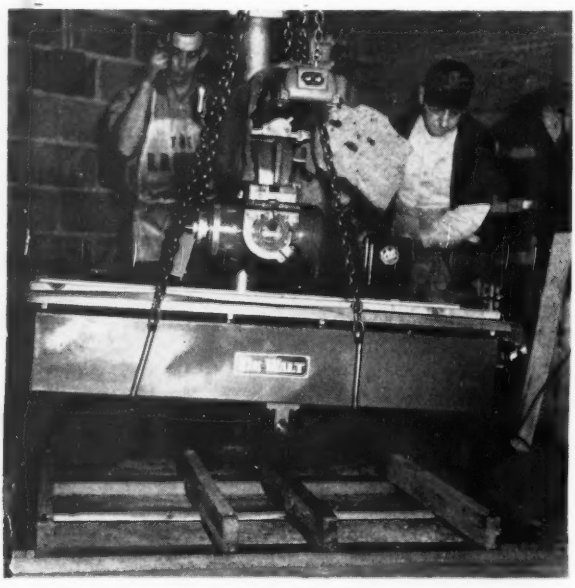


Fig. 1—A power saw is lowered onto a pre-fabricated base as the first step in crating.

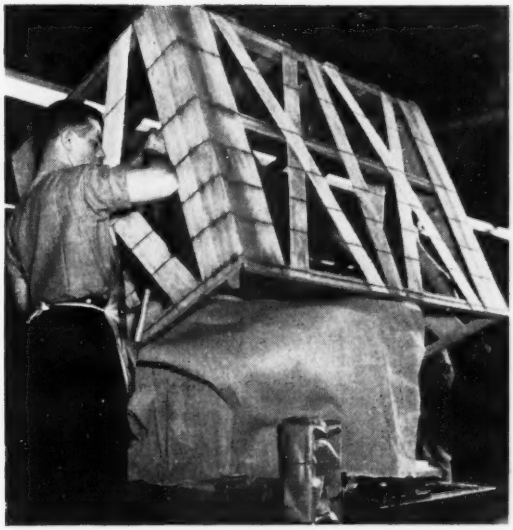


Fig. 2—Pre-assembled top section of a wirebound crate is slipped over a power saw.

damage due to container failure has been eliminated almost entirely.

Power saws produced at the Dewalt plant, because of their weight, size, precision construction, and need for thorough protection against shocks and jars during shipment, must be packed carefully. The first step in the new method of crating is to lower a saw, by means of a hoist, onto a strong, pre-fabricated base, as shown in Fig. 1, and fasten it securely. Next, the cutting tool and motor on the power saw are given maximum protection by being packed in excelsior in a separate wirebound box which, in turn, is strapped to the saw table. This box and the radial arm, which is locked in position, are then covered by a dust-proof and weather-resistant bag.

While these operations are being completed, two men assemble the top and sides of the crate. A 16½ ft., one-piece wirebound "mat" is folded to form a four-sided crate, the binding wires at the two ends being engaged and twisted to hold the unit in shape. The top of the crate is then placed in position and nailed to the "mat." The final step is to slip the assembled top section of the crate over the saw, as shown in Fig. 2, and nail it securely to the crate base.

Crated saws weighing 775 lb. each are then stacked four-high to await shipment, as may be seen in Fig. 3. The last of the "home made" crates, which were used previously, may be seen at the left in this illustration.

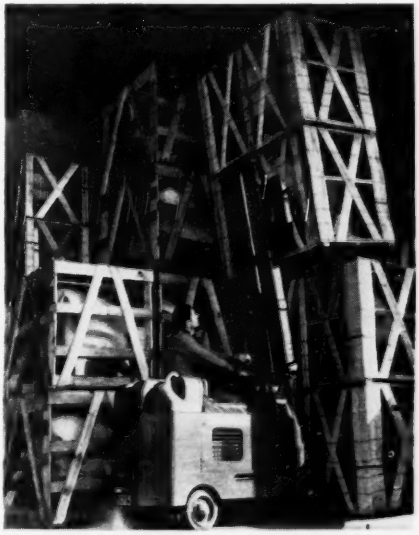
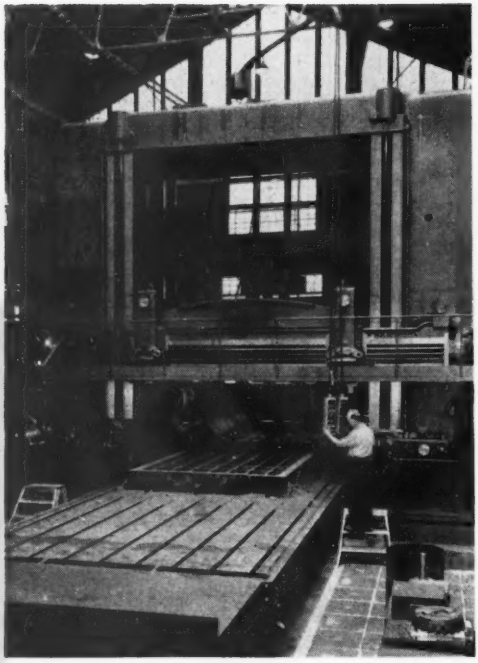


Fig. 3—Crates are stacked four-high to await shipment. Old-style crates may be seen at the left.



Huge Consolidated planer and milling machine as installed at the G-E Schenectady Works

Huge Planer and Milling Machine

SHOWN in the accompanying illustration is a huge planer and milling machine which has been placed in operation at the Schenectady Works of the General Electric Company. In the machine, slivers of steel only 0.001 inch thick may be shaved from a block which is the size of a railroad box-car. The machine was built by the Consolidated Machine Tool Corporation of Rochester, New York, and it is powered by G-E motors; it is to be used in the manufacture of equipment for industrial and power generating applications, such as synchronous condensers, hydraulic turbine-driven generators, and large steel mill motors and generators.

The machine has a 27-foot high arch and a 40-foot long table which is made to slide through the archway. Loads up to 200 tons may be carried on the machine table; and, because of its size, several parts may be bolted together, loaded on the table, and handled as a single unit. The machine is set in a foundation which, according to G-E engineers, required 30,000 pounds of steel and enough concrete to lay a sidewalk more than two and one-half miles.

The machine is regulated from two pendant-type push-button stations which contain complete electronic control equipment. The stations, one for

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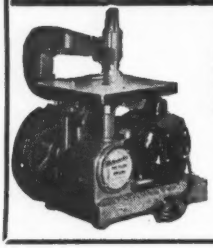

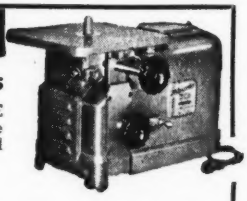

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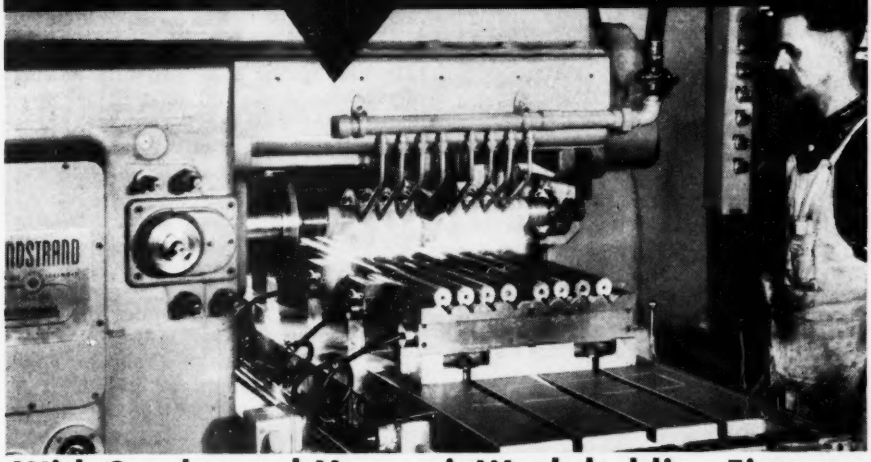

With Sundstrand Magnetic Work-holding Fixtures

Illustrated above is a magnetic fixture holding eight shafts abreast for a keyway milling operation. The job requirements called for a universal fixture capable of handling 20 different parts including straight shafts, step shafts and crankshafts. The magnetic fixture shown improved the operation and saved time and money *the five different ways indicated below* over mechanical and other means of clamping.

1 Elimination of mechanical clamps reduced the width of the fixture and made possible the use of a narrower machine table.

2 Savings were effected through the use of smaller diameter cutters due to the fact that no clearance is required over mechanical clamps.

3 The magnetic fixture made it easier to change from one size and type of parts to others. In this particular case, the parts machined include straight shafts, step shafts, and crankshafts. Twenty different parts are machined, each having from one to four keyways.

4 Loading and unloading of shafts is simplified. No clamps need to be loosened, operator merely presses a push button.

5 In the installation illustrated above, the magnetic fixture cost is approximately half that of a mechanical clamp fixture designed to handle the same range and types of parts.

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milling and one for planing operation control, may be moved easily in order to facilitate control of the machine by the operator. Protruding from the bottom of each pendant station is an emergency lever which responds to a light touch of a finger and which, if touched, will cause the machine to be stopped instantly.

A single switch is used to convert the machine to either a planer or a milling unit. When the machine is operated as a planer, a 100 h.p. motor is used to move the table at speeds ranging from 10 to 150 feet per minute. During a milling operation, two 50 h.p. motors are used to operate the cutters, and the table is moved at the rate of from 3 to 45 inches per minute. The maximum length of material which may be milled is 30 feet. Since the machine may be used either as a planer or a milling machine, the job of transferring work when both operations are required is eliminated.

Duplicating Controls for Machine Tools

AN increasing necessity for machining metals to unusual shapes and forms has augmented the development of automatic duplicating controls for machine tools. By using duplicating controls, paths of travel may be obtained which are not readily obtainable by the standard movements of machine tools; and, in addition, production rates on very complex parts produced on standard tools may be increased by the use of these duplicating controls.

The theory of duplicating controls is that of using an interconnecting control system to reproduce a given shape on the part desired from a pre-established master part. A duplicating control system must provide the same degree of accuracy as the machine tool on which it is mounted; and the follower mechanism which is moved over the master part must be designed

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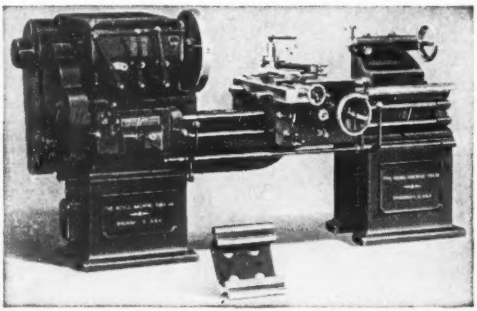

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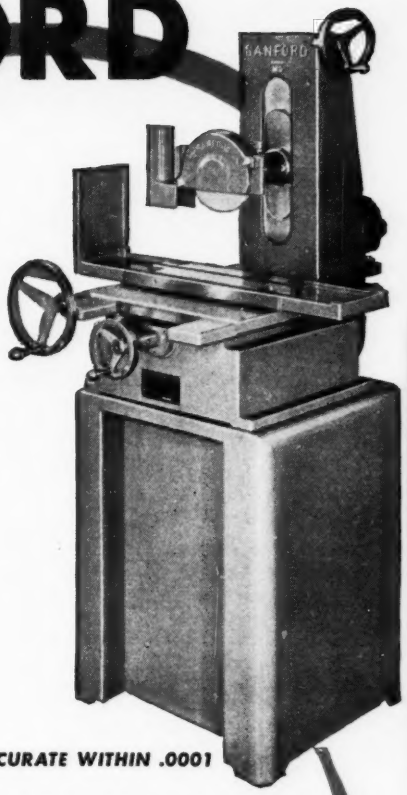

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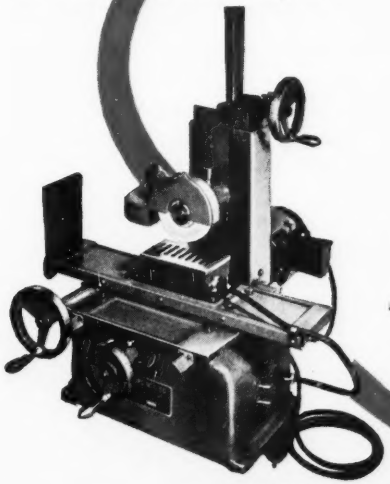

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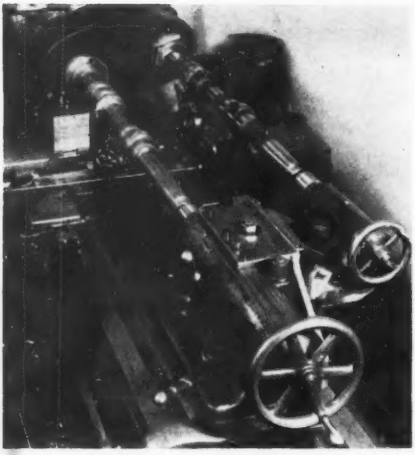

Fig. 1—Duplicating control system as installed on a lathe for machining diesel locomotive cams.

to control direction of movement, rate of movement, and amount of movement. To have good duplication, the rules listed here should be followed:

(1) The machine tool used should be well built and capable of removing a maximum amount of excess stock.

(2) The follower used should be precision built, capable of extremely sensitive operation, simple in design, and constructed to require a minimum amount of maintenance.

(3) Accuracy of the master part, or template, is all-important. The parts duplicated will be only as good as the model.

Two applications of duplicating controls which are produced by the Turchan Follower Machine Co. of Detroit may be seen in the accompanying illustrations. The Turchan systems are hydraulic and consist basically of three parts, (1) a power unit which supplies fluid under pressure, (2) a tracer, or the "brain" of the unit, which controls the flow of oil supplied by the power unit, and (3) cylinders (or fluid motor) which provides the

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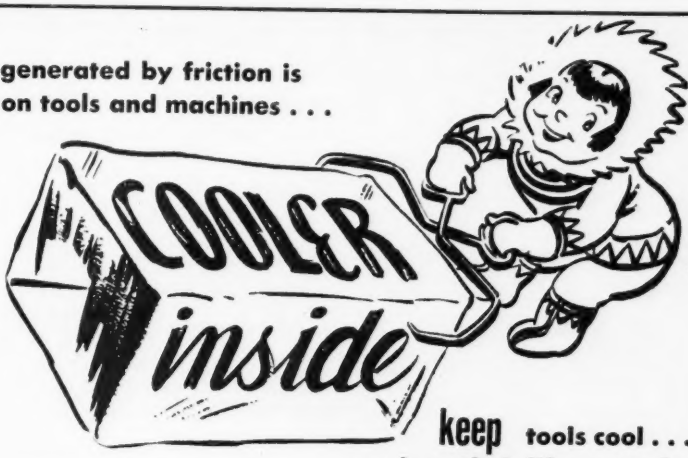

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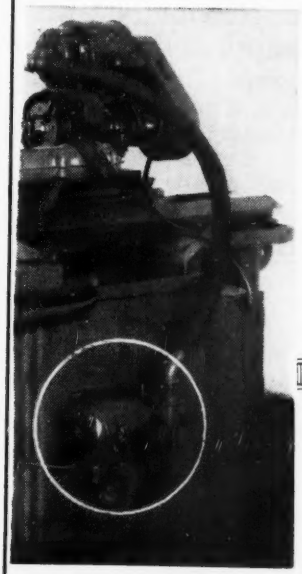

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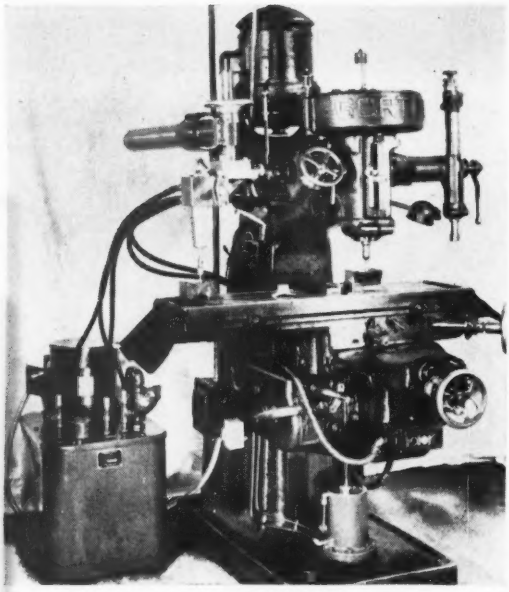

Fig. 2—Turchan duplicating systems such as the one shown here are used for die, mould and pattern work, and similar jobs.

as the blank shaft; and as the follower is moved over the master, an identical pattern is reproduced on the blank. A Turchan equipped Gorton vertical unit may be seen in Fig. 2; in this case, a special concave surface is being produced on a desired part.

means of transmitting the controlled fluid flow under pressure to the movement desired.

Fig. 1 shows a duplicating system as installed on a Lodge and Shipley lathe. The job being performed is that of turning diesel locomotive cams. The auxiliary drive shown at the rear of the lathe bed is used to hold the master cam shaft and to control movement of the cross slide. The master cam shaft is set to rotate in the same direction and at the same rate of speed

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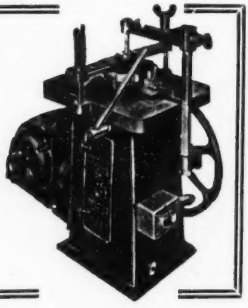

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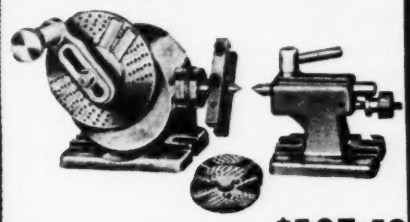

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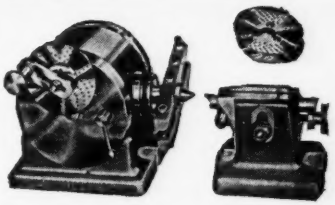

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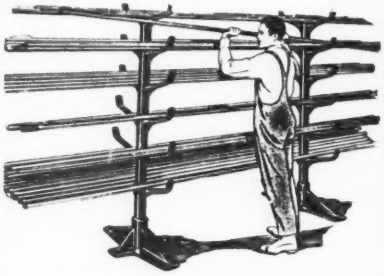

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iron casting. As may be seen in Fig. 1, the two double wheel grinders and one double spindle buffer which are used are well hooded and ventilated to a dust filter mounted outside of the building. A view of this filtering equipment on the outside of the building is shown in Fig. 2. The filter is of the cloth-bag type; and an exhaust fan and drive, which are mounted on top of the dust filter framework, are used to create suction at the machine hoods

Fig. 1—Dust from the grinding and buffing operations is carried through the system to a filter outside of the building.

in order to draw dust and metal particles through the piping and into the filter.

The airborne material is retained on the filter bags, thus allowing only clean air to be passed through to the atmosphere. A hopper is built into the bottom of the filter framework, and dust from the bags falls into this hopper when the bags are agitated by a shaking device. The bags are agitated automatically after the exhaust fan is stopped.

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Fig. 2—View of Sly filter equipment on the outside of the building.

ment in the plant may be seen along a production line of two automatic screw machines, a double spindle drilling machine, and a hand milling machine. This machinery is ventilated and kept dust-free by a Sly "Economy" type dust filter installed inside of the building. The dust nuisance, which is usually encountered in cases where no ventilation is provided, is to a large degree eliminated.

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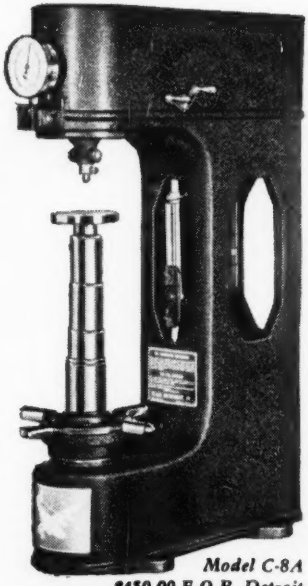

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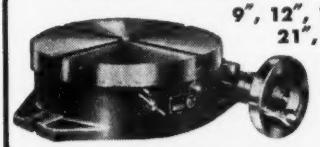

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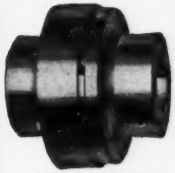

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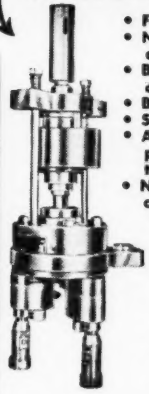

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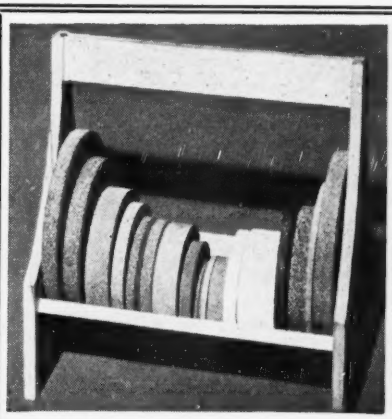

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machine, unacceptable parts are ejected into separate chutes after they are classified as being either completely rejectable or suitable for salvage and rework.

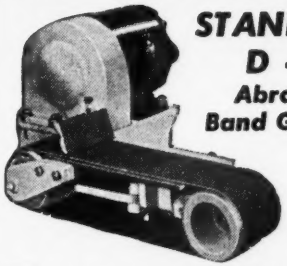
The gaging unit consists basically of a loading station, five gaging stations, five segregating stations, and two unloading stations. The tappets are moved through the machine by means of a walking beam; they are lifted and carried progressively through a series of tungsten carbide-faced vees. Protective switches are provided at each gaging and segregating station in order to stop the machine immediately in case of a jam, and a red light is provided on the indicating panel in order to show the exact location of the jam. A fixed type snap gage, which is built in the top of the loading chute, is used to prevent excessively oversized parts from entering the unit.

The machine, which was produced by the Sheffield Corporation of Dayton 1, Ohio, is built for continuous mass production usage, and it is designed to require a minimum amount of maintenance.

Roll Turning Lathe, a template-controlled machine for the contour turning of steel mill rolls, is the subject of a well-illustrated 12-page booklet issued by The Monarch Machine Tool Co., Sidney, Ohio. The booklet reviews the various features of the machine and includes representative application data, as well as detailed equipment specifications.

Collet Chucks. The Sutton Tool Co., Sturgis, Mich., has published an 8½ x 11-inch two-color catalog illustrating and describing the Porst line of "Levermatic" and "Handimatic" collet chucks featuring external and internal gripping and releasing features. Copy free.

Universal Electric Belt Sander. Punched for binder insertion, Circular No. JE-1131 covering the Thor Silver Line 4½-Inch Universal Electric Belt Sander has been released by the Independent Pneumatic Tool Co., 175 State St., Aurora, Illinois. Copy free.



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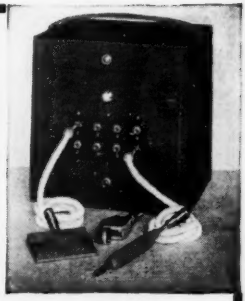

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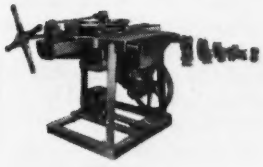

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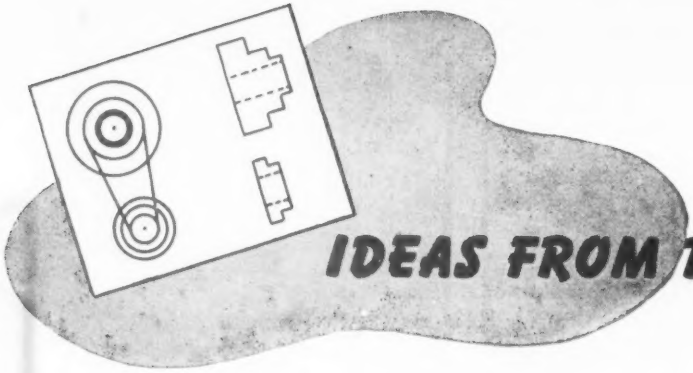


IDEAS FROM READERS

Drill Jig for Reducing Non-Productive Time

By Robert Mawson

A SPECIAL drill jig has been designed for the drilling and tapping of the two holes in the machined segment shown in Fig. 1. Each segment is one of three cut from a machine steel ring; and, previous to the drilling and tapping operations, a ½ x ¼ inch slot is milled in each piece. The drill jig was designed with particular emphasis on reducing the amount of time spent in locating and removing the piece; a definite effort was made to decrease to a minimum the non-productive time on the job.

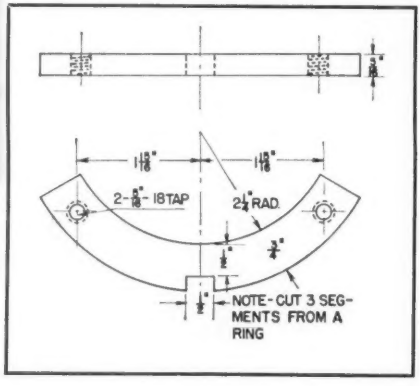


Fig. 1—Segment for which drill jig shown in Fig. 2 was designed.

The jig, shown in Fig. 2, is made with a circular cast iron base, **A**, having a small circular projection, **B**, on its upper surface. A special stud, **C**, is driven into the base as shown. A machine steel plate, **D**, which is knurled on its outer periphery and in which a six inch diameter recess is machined, is placed on top of the base so that it may be rotated on the stud. The nut, **E**, is then tightened down just enough so that the plate will continue to turn freely; and a small hole, **F**, is drilled through the nut and stud, and a pin inserted to maintain this position. Four locating pins, **G**, are driven into the recess in **D**; and they are located so that, when a segment is placed in the recess, the ends of the segment will rest against the pins. Two notches, **H**, are machined in **D** slightly wider than the slots in the segments but located so that they will line up with the segment slots.

At the rear of the jig, an L-shaped drill bushing plate, **I**, is attached to the base by means of four filister head screws. A thumbscrew, **J**, is located in the top surface and along the centerline of this bushing plate; and, directly behind the thumbscrew, the slot locating device is mounted. A side view of

the main parts of the device may be seen in Fig. 3. The device consists mainly of a small bracket, **K,** which is screwed into the jig base, and a slot locator, **L,** connected to the bracket by means of a connecting pin, **M.** The slot locator is machined on surface **N** to fit into the slots in the segments. Located in the space between the bracket and the slot locator, and positioned

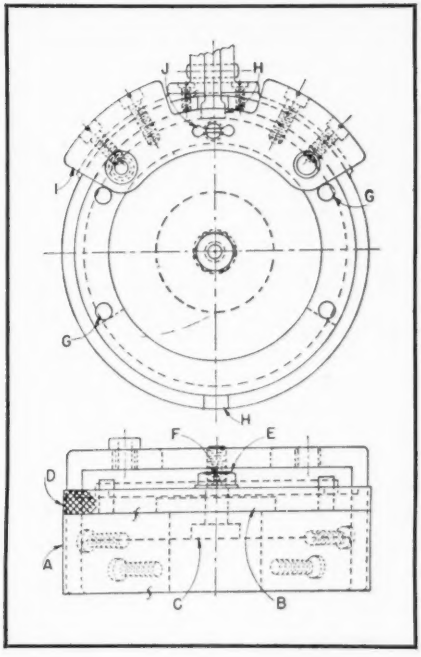
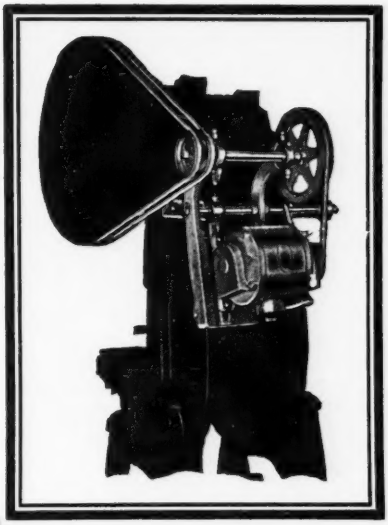


Fig. 2—Drill jig designed to reduce non-productive time to a minimum.

in recesses in these two parts, is a tension spring, **O.** As the spring is compressed and expanded, the slot locator pivots on **M.**

To use the jig, the operator first places a segment in the machined recess in plate **D,** positioning the part against the two front locating pins. The plate is then rotated 180 deg., using the knurled surface for turning,



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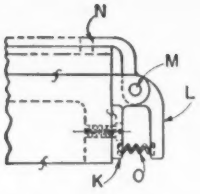
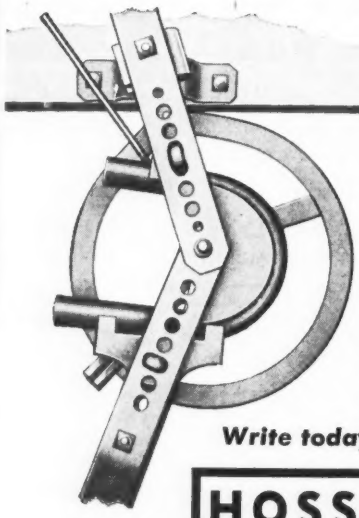


Fig. 3—Side view of slot locating device.

to bring the slot in the segment in line with the slot locator. While the plate is being turned, the operator presses down on the lower portion of the slot locator to compress the spring and assure that the slot locator will not interfere with the rotation of the segment. When the segment slot is in line with the slot locator, the operator removes his thumb from the slot locator, and the slot locator is snapped into position against the side of the slot. The thumbscrew is then tightened down to hold the segment securely in place. It may be noticed that the center rear portion of the drill bushing plate, **I**, was cut away so that the slot locator could be seen by the operator at all times.

The two holes are then drilled and tapped, the tools being guided through slip bushings in the drill bushing plate in the conventional manner. While one segment is being drilled and tapped, another segment is placed in the front of the jig. Then, when the drilling and tapping operations are completed, the thumbscrew is untightened, pressure is applied to the slot locator to remove it from the slot, and the finished segment is returned to its former position. As the plate is rotated, the segment that has been placed in the front of the jig is brought to position for machining; the finished segment is removed from the jig, and another segment is put in its place. This sequence of readying a segment while another is being machined is continued until the job is completed. The machining operations are therefore continuous with the exception of the short amount of time lost in revolving the plate and setting the slot locator.



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Simple Jig for Machining Cast Iron Handles

By W. A. Stern

THE small cast iron handle shown in Fig. 1 is used with a small circle cutting attachment. The handle is a relatively simple part, but the machining operations performed on it include the following: drilling a $\frac{5}{16}$ inch diameter hole through the one inch diameter section; counterboring the $\frac{5}{16}$ inch

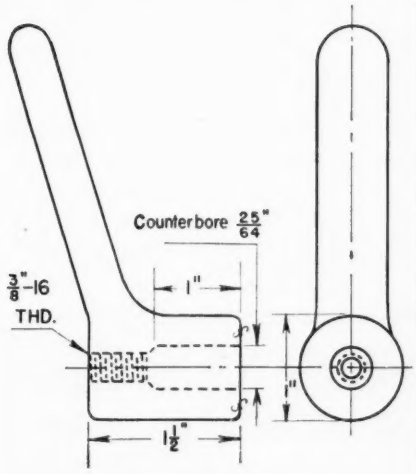

Fig. 1—A cast iron handle.

hole to a 25/64 inch diameter for a depth of one inch; tapping the remaining length of the hole with $\frac{3}{8}$-inch—16 threads; and facing the front face. The previous methods used to perform these operations were to drill the $\frac{5}{16}$ inch hole using a Universal chuck, counterbore on a drill press, hand tap the part in a vise, and then screw the part onto a threaded mandrel for facing.

Fig. 2 shows a jig which was designed to hold the handle so that all of the operations could be performed in a turret lathe. The jig is made from a piece

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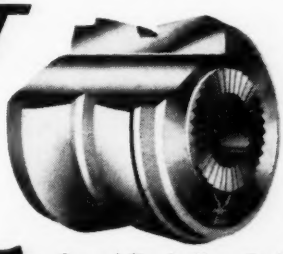
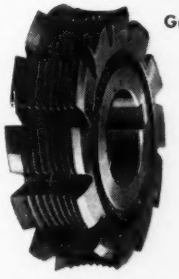
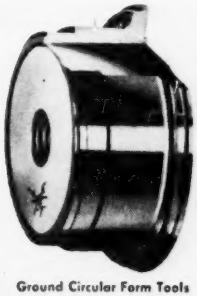


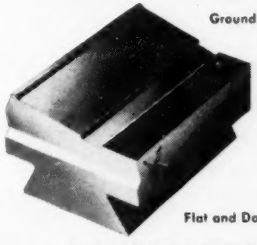
Ground Circular Form Tools



Form Relieved Cutters



Ground Circular Form Tools



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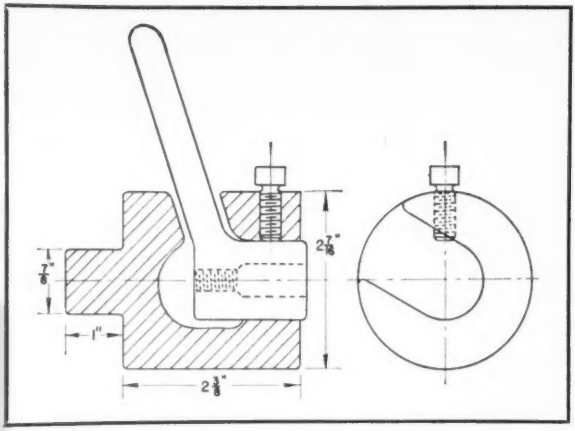


Fig. 2 — Jig designed to be used when machining the handle shown in Fig. 1.

may be seen.

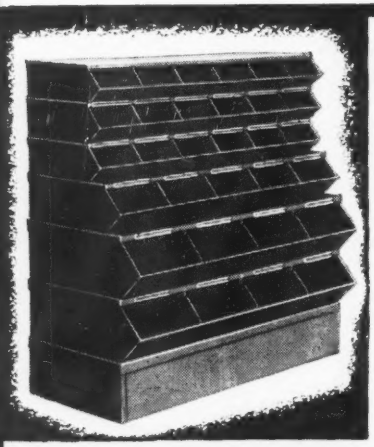
The ⅞ inch diameter projection is placed in a draw-in collet chuck, and all of the operations may be performed quite easily. With the new method, the reduction in machining time amounts to more than 50 per cent.

of round stock and machined as shown. A notch is cut longitudinally into the jig at a 45 deg. angle for insertion of the handle body, and another cut is made across the jig to accommodate the handle grip. The handle is held in position by means of a set screw, as

A Method of Cutting Threads with a Die Head in a Lathe

By Michael Axler

THIS article describes a method of cutting threads by using a die head in an ordinary lathe. The set-up used



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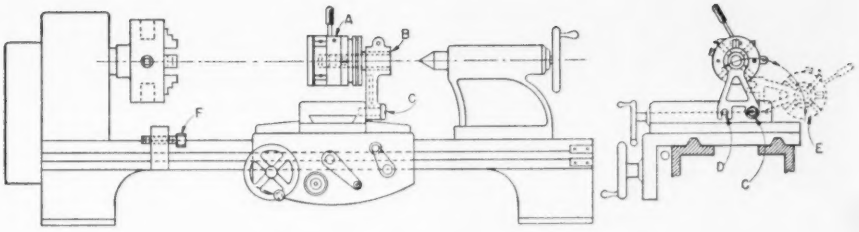
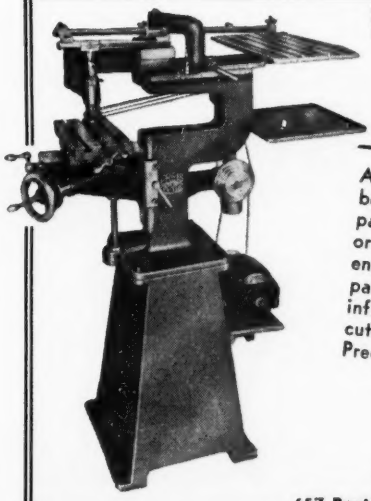


Set-up on lathe carriage for cutting threads with a die head.

may be seen in the accompanying illustration.

In many shops, it is often necessary to make small lots of various sized bolts and nuts. Regular engine lathes are used to produce these items; and, to speed up production, the fixture shown in the illustration was designed. It was made to fit onto the lathe carriage of an American 14 inch lathe. A geometric "DD" die head, constructed with a floating feature to compensate for imperfect centering of the head, was used.

The die head, **A,** is held in fixture **B** which, in turn, is fastened to the lathe carriage by means of bolt **C.** The fixture has two legs, as shown; a hole is drilled through the right leg through which bolt **C** is passed, and an open slot, **D,** is provided in the left leg. The fixture is designed to pivot on bolt **C** so that, when not in use, it may be swung out of the way. This feature is



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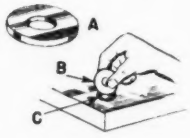
shown by the dotted lines, **E**; and, when the fixture is in this horizontal position, the lathe may be used in its usual manner without interference. A removable stop, **F**, is provided for adjusting to the length of thread cut.

In operation, the bolts or studs are turned in the lathe in the usual manner. The fixture is then moved to a vertical position and locked in place; this brings the die head into cutting position. The carriage is moved up to the work, the threading is started, and the operation is continued until the stop is contacted. The fixture may then be rotated to a horizontal position so that the operator may proceed with any other lathe work.

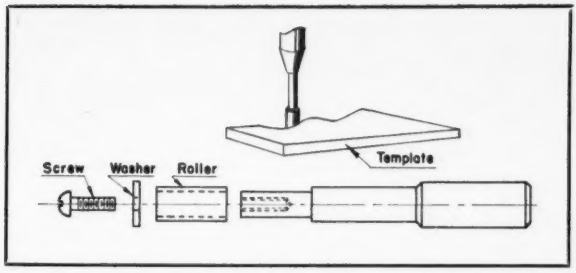
Handy Burr Remover

By A. H. WAYCHOFF

THE illustration shows a handy burr remover which may be carried in a workman's pocket. The burr remover is made from a hardened steel washer whose sides are carefully ground square so that the corners are sharp, as shown at **A**. The burrs may be removed from a drilled or tapped hole by holding the washer on the hole and at right angles to the hole, as shown at **B**, and then turning the washer in the hole. A slight bevel, **C**, is made at the edges of the hole. Most sizes of small holes may be deburred by any of two or three washers in his pocket. Other methods used for deburring may include the use of a round file or an oversize drill bit, and often it is necessary for the workman to walk to the tool rack to obtain these tools; thus, much time may be saved by employing the specially ground washers described here.



Specially ground washers used for removing burrs.



Sketch of a roller follower for a duplicating machine.

Follower for Duplicating Machine

By Edward Diskavich

THE writer has found that a follower which is applied to a template of a duplicating machine will operate with a minimum amount of friction and will smoothly follow the contour of the template if it is made in the form of a roller. A roller follower may be seen in the illustration. The outside diameter of the roller is machined to about 1/64 inch less than twice the smallest radius to be followed on the template in order to obtain exact duplication; the inside diameter of the roller is bored accurately so that, when the roller is fitted on the follower shaft, there is just enough clearance to allow the roller to roll freely. The roller is held on the shaft by means of a washer and a screw, as shown.

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News of the Industry

Starrett Completes New Hack Saw and Band Saw Division Plant

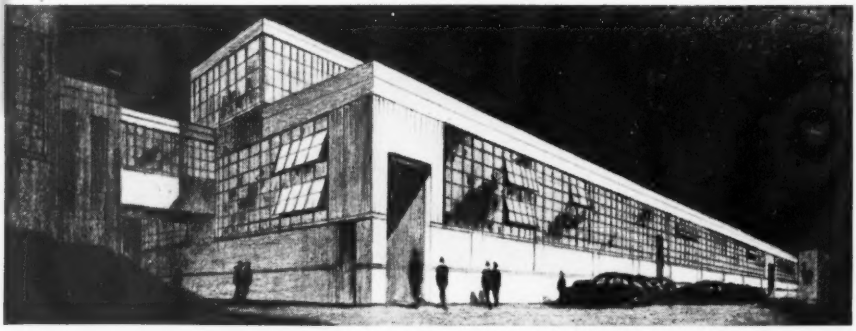
Arthur H. Starrett, president of The L. S. Starrett Co., Athol, Mass., has announced the completion of a new plant expansion housing the company's hack saw, band saw, band knife, and precision ground flat stock division. The plant layout is particularly interesting in that three major lines for the straight-line production of hack saws, band saws, and band knives are utilized, all three lines diverging from a common raw material receiving dock and converging again at the end of the lines to the inspection, packing, and shipping section. Manufacture of precision ground flat stock is concentrated adjacent to steel receiving and completed work also has a straight-line flow down through the inspection, packing, and receiving departments. To ensure uniformly high quality, close metallurgical control of all steel used in the various products is maintained by a modern, newly equipped metallurgical laboratory strategically located for checking raw steel analysis as well as steel structure throughout every phase of manufacturing.

The building is monitor type, 114 feet wide x 408 feet long, entirely made of concrete, steel and special heat-resisting glass, and has three bays, each 38 feet wide. The foundation and skirt walls are made of concrete, above which steel window sash extend up to Transite trim below the steel decked, insulated monitor roof. Adjacent to the building is a paved parking area for employees.

A unique feature is the visitors' gallery running around the monitor which permits observation of the various manufacturing processes as well as convenient building maintenance. Because of almost continuous windows in both the side walls and monitor, illumination is at a very high level of 80-100 foot-candles throughout the building for ideal working conditions. This is supplemented by a modern system of Mazda lighting. All electrical lines are in steel conduits suspended from the gallery and fed from the main transformer bank located inside the building. Individual motor drives are used throughout.

Heating is done by steam using fin-type radiation on the lower walls under the windows and unit space heaters in the monitor. For the convenience of employees, modern sanitary conveniences are furnished, including circular type wash fountains and steel lockers for personal belongings.

All heat-treating units are manifolded and fumes exhausted by high power exhaust fans. Air used in sandblasting is exhausted through a water washed dust



Architectural Sketch of New Starrett Hack Saw and Band Saw Division Plant

Starrett officers inspecting band saw operation in new plant are (left to right) Allen E. Hastings, treasurer; William J. Greene, vice president and director of sales; Wallace Findlay, assistant treasurer; and Arthur H. Starrett, president.

collector and returned to the building for reuse.

With the new addition, Starrett manufacturing facilities now provide 9 acres of floor space devoted to the production of mechanics' hand measuring tools and precision instruments, dial indicators, steel tapes, hack saws, band saws, band knives, and precision ground flat stock.

Eutectic Celebrates New Plant Opening

Over 400 guests of Eutectic Welding Alloys Corporation recently attended the formal opening of the new Eutectic plant in Flushing, New York. The plant was fittingly opened by severing a steel ribbon with Eutectic's new arc metal-cutting electrode, CutTrode.

Prof. Otto H. Henry of Polytechnic Institute of Brooklyn was guest speaker, and Rene D. Wasserman, president and founder of Eutectic, described the research and development program conducted by the company during its eight years in existence. The ceremonies were held in the plant's assembly hall where many of the guests, representing leading industries, were given their first look at the recently announced training school, Eutectic Welding Institute.

Highlight of the afternoon was a tour of the plant during which guests were shown the laboratories, foundry, Chemical Division, EutectoFilm Section, and the giant high speed extrusion presses of Eutectic's own design.

Lyon Metal Acquires New Eastern Plant

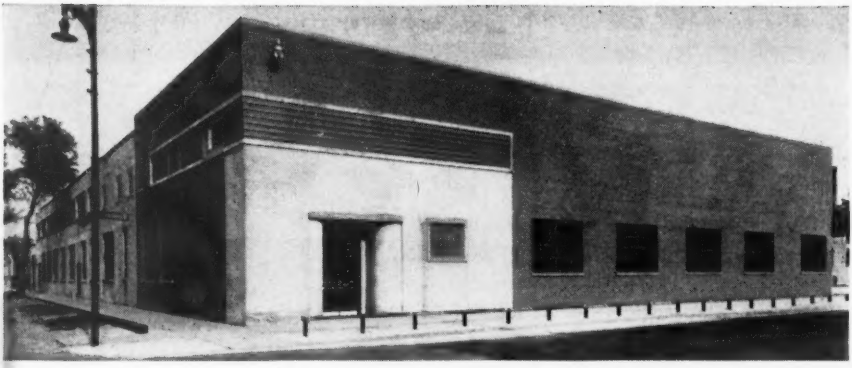
Lyon Metal Products, Incorporated, with plants in Aurora and Chicago Heights, Illinois, has announced the purchase of the York, Pennsylvania plant of the Owens Yacht Company. The York property provides 200,000 square feet of floor space and a modern factory layout in which Lyon will soon start production of a diversified line of steel products to serve its Atlantic Seaboard markets.

The plant, completed in 1946, is of modern construction—concrete, brick, and steel sash—ideally laid out for the straight-line production of Lyon's various products. All manufacturing and shipping facilities are on the ground floor, with offices and rest rooms on mezzanines.

Hannifin Corporation Holds Sales Conference in New Plant

"It pays to spend money for cost-cutting equipment" was the theme for a national meeting of field engineers and sales representatives from all parts of the country attending a four-day conference at Hannifin Corporation, Chicago. November 4, 5, 6 and 7, 1949. Organized under the personal direction of Ellwood G. Peterson, president, the program was designed to acquaint visitors with latest precision methods of manufacture as employed in the company's new Chicago plant and to provide a preview of new products and new models in Hannifin's line of pneumatic and hydraulic production equipment.

Conference sessions were devoted to comprehensive presentations on the application and operation of Hannifin products, together with studies of the engineering considerations involved in the



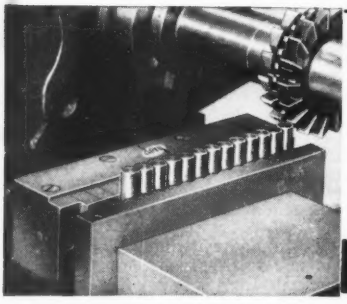
New Plant of Hannifin Corporation, Chicago

field of hydraulic and pneumatic equipment. Headed by H. H. Adams, vice president-sales, members of the Hannifin sales staff conducted detailed discussions of problems encountered in a wide variety of applications of hydraulic and pneumatic cylinders, hydraulic presses, hydraulic riveters, and air control valves.

Under the direction of O. J. Maha, vice president-engineering, members of the Hannifin engineering staff presented papers on the company's design and electric circuits, and J.I.C. hydraulic and development program, hydraulic and electrical standards. Mr. Maha's report also included a discussion of trends in industrial hydraulics and work accomplished at the 5th Annual Meeting of the "National Conference on Industrial Hydraulics" which was held in Chicago, October 25 and 26, with Mr. Maha serving as the conference director. In all sessions, visiting representatives had opportunity to present individual problems for thorough discussion and recommendations.

Porter-Cable Purchases Sterling Manufacturing Facilities

The Porter-Cable Machine Co., Syracuse 8, N. Y., manufacturer of "Speedmatic" and "Guild" portable electric tools, has purchased the manufacturing rights and facilities of the Sterling Electric Tool Products Co., Chicago, Ill., for the production of Sterling portable electric and pneumatic sanders, according to an announcement made by DeAlton J. Ridings, president of Porter-Cable. The purchase is the result of negotiations recently completed in Chicago with the assistance of Stewart A. Hancock, a director of the company and legal counsel; Lloyd B. Benham, vice president and factory manager of Porter-Cable; John A. Proven, vice president in charge of sales; John I. Dean, assistant to the vice president in charge of sales; and Robert C. Tyo, secretary and comptroller of the firm. The inventory tools and production facilities purchased will be moved to Syracuse.



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Several members of the Sterling sales organization will be taken into the Porter-Cable Company. These include John R. Perkins, formerly a special sales representative for Sterling, who will become a field representative instructing Porter-Cable sales personnel in the merchandising of Sterling products and who will later become a district sales representative with the firm. Earl C. Wheless, Sterling district representative for four years, will become a sales representative in the San Francisco area. Norbert B. Leydorf, previously northwest territory district manager for Sterling, will be stationed in Richmond, Virginia.

Also joining the Porter-Cable sales organization are Jerome J. Howe, who was with Sterling in the St. Louis area and who will become a representative in Houston, Texas; Howard Smith, formerly a sales representative for a Sterling manufacturing agent, who will work out of Philadelphia; and Neil S. Rowe, former district manager in New England and eastern New York for Sterling, who will become a Porter-Cable sales representative.

O. K. Tool Company Under New Management

The assets of The O. K. Tool Co., Shelton, Conn., manufacturer of single-point and inserted blade type milling cutters, have been acquired by Williams & Hussey, Wilton, N. H., manufacturer of special machinery and "Star" gages. The O. K. Tool sales staff and executive personnel remains intact. Alfred L. Marshall continues as general manager of The O. K. Tool Company, which will operate as a division of the parent company.

New Building for American Drill Bushing Company, Inc.

The American Drill Bushing Co., Inc., Los Angeles 11, Calif., has announced the opening of its new modern office headquarters and manufacturing plant at 5107 Pacific Blvd. The plant, occupying a large area, provides ample parking space and also additional room for more modern equipment and increased production facilities. Storage space is provided for maintaining complete stocks of A.S.A. standard drill jig bushings for ready distribution to exclusive distributors throughout the United States and Canada. The unusual growth of the company has resulted in the outgrowing of three previous locations.

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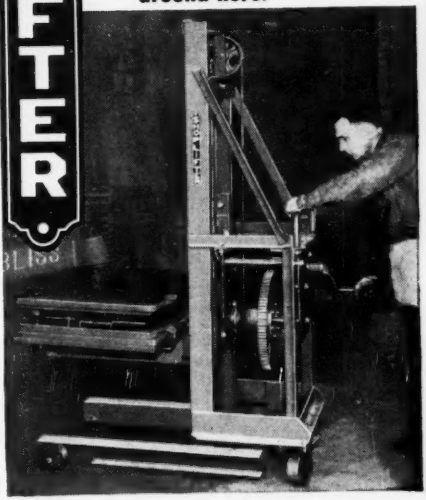

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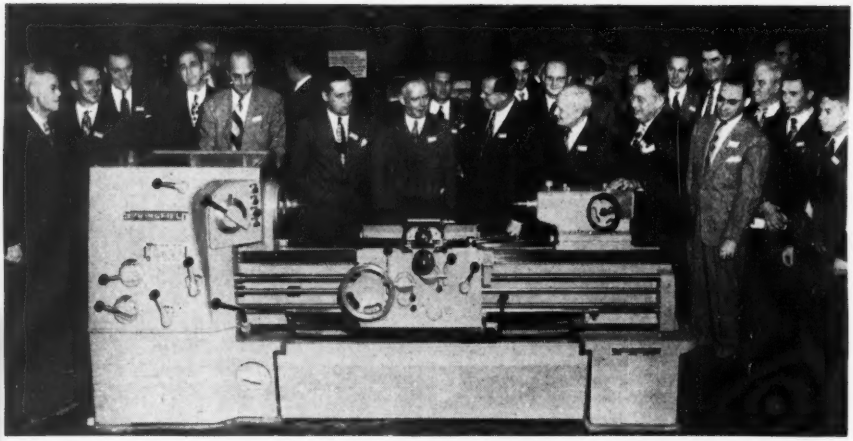


Illustration showing a front view of the new Springfield Model S Lathe, together with Springfield personnel and visitors attending the demonstration. The three men standing directly to the right of the lathe headstock are (left to right) F. M. Montanus, secretary; Paul A. Montanus, president, and R. C. Montanus, vice president, The Springfield Machine Tool Company.

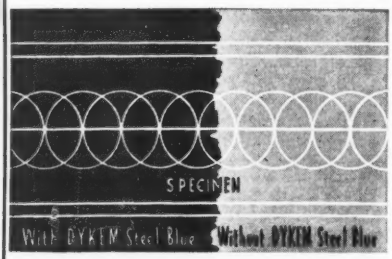
Springfield Holds Educational Meeting and Demonstration on New Lathe

On November 3, 1949, The Springfield Machine Tool Co., Springfield, Ohio, introduced its new 16-inch Model S Lathe at a demonstration and educational meeting held at the company plant. Distributors and sales engineers from all territories in the United States and Canada, as well as several foreign representatives, were present. In addition to a demonstration of the new lathe, which was two years in the development, there were also demonstrations of contour turning and special grinding machines. Educational sessions began in the plant immediately after breakfast on Thursday.

Plant Maintenance Show and Conference

A group of 21 experts will lead what is believed will be the most exhaustive discussions of plant maintenance problems ever undertaken at a conference to be held concurrently with the Plant Maintenance Show at the Auditorium, Cleveland, Ohio, January 16-19 inclusive.

Sponsored by the American Society of Mechanical Engineers and the Society for the Advancement of Management, the conference will include talks on maintenance management principles; maintenance cost; light equipment; upkeep of motors, controls, distribution equipment, floors, walls, and roofs; use of electrical instruments in maintenance;



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(In Canada: 2466 Dundas St., West, Toronto, Ont.)

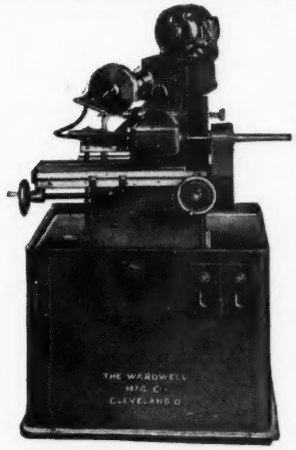
C. Neil Norgren, Assistant General Manager of C. A. Norgren Company, Showing W. A. Horswill the Results of Lubricator Test in Norgren Engineering Laboratory

relationship of color and light to production; sanitation; lubrication; use of service equipment; and personnel safety. On exhibition will be machines and products manufactured by companies for maintenance.

English Manufacturer Visits Norgren

William A. Horswill, director of Shipston Engineering Co., Ltd., England, recently completed a two-week visit at the C. A. Norgren Co., Denver, Colorado. Mr. Horswill is in charge of manufacturing at the firm which has been licensed and authorized to make Norgren pneumatic products for Great Britain. Their plant is located at Shipston-on-Stour, Warwickshire.

While at the Norgren plant, Mr. Horswill made a thorough study of the firm's engineering and production methods and gained knowledge of the many unusual requirements over the broad range of product applications. The Norgren firm manufactures oil-fog lubricators, air filters, pressure regulators, valves, hose couplings, and hose assemblies for industrial use.



THE WARDWELL MFG. CO. CLEVELAND O

THE WARDWELL MANUFACTURING CO.
3166 FULTON ROAD
CLEVELAND 9, OHIO

CARBIDE FLUTING COSTS LESS WITH
WARDWELL 90FS
Automatic Universal Flute Grinder

Indexes automatically. Grinds and sharpens taps, reamers, milling cutters, end mills. Greater speed! Greater precision! Grind spiral flutes from solid more economically with Wardwell 90FS. Grinds spiral angles up to 45° and spiral leads as short as $\frac{5}{16}$" to one turn. Sharpens saws up to 12" in diameter and in gangs up to 7¾" long.

Write for Bulletin 90FS.

W. A. Ferguson, sales manager of The Standard Electrical Tool Co., explains features of Standard Twin-Wheel Tool Grinder to John E. Cizmar and Dale E. Williams of General Fireproofing Company. R. F. Hutchinson, service engineer of Kennametal Inc., is shown demonstrating use of grinder.

Twin-Wheel Tool Grinder Introduced at Metal Show

The Standard Electrical Tool Co., 2487 River Road, Cincinnati 4, Ohio, displayed a twin-wheel carbide tool grinder at the Metal Show held in Cleveland during the week of October 17. A considerable amount of interest was shown in the various features of the new grinder, particularly the saving in grinding time made possible with rough and finish grinding operations being confined to a single, compact grinder. Attractive circulars describing the new grinder in detail were distributed to those who visited The Standard Electrical Tool Co. booth. Copies of the circular can be obtained by writing to the company.

Dor-O-Matic Merged with Logan Engineering

The Logan Engineering Company has announced the completion of details involved in merging the Dor-O-Matic Company, producer of door controls, into the Logan organization. The manufacture of Dor-O-Matic Products has been transferred from the Dor-O-Matic factory at 818 S. Kolmar Ave., Chicago, to the recently enlarged modern Logan plant at 4901 W. Lawrence Ave., Chicago.

A division has been set up within the Logan organization to handle the production and distribution of the newly acquired line of door checks on a nation wide basis. In addition to the activities of its new Dor-O-Matic Door Control Division, Logan will continue to manufacture its line of lathes at the Lawrence Avenue plant.

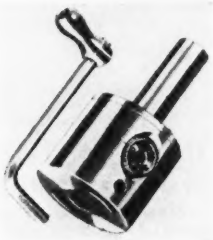
Cincinnati Lathe & Tool Company Acquires Canedy-Otto Drill Line

The well-known line of light upright, sensitive, and radial drills manufactured by The Canedy-Otto Mfg. Co., Chicago Heights, Ill., has been acquired by the Cincinnati Lathe & Tool Co., Oakley, Cin-

TOOL MAKERS SELF LOCKING BORING CHUCK - - - $15.00

Body Diameter—1½"; length 1⅜"
Shank Diameter—½"; length 1½"
Tool Movement—⅜" adjustable in thousandths
Tool Diameter—⅜"
Hardened and tempered screw, tool block and shank.

SPECIAL SHANKS AVAILABLE **F.O.B. Manchester**



SMITH BORING CHUCK CO.
Box 69 Manchester, Connecticut

cinnati, Ohio. All operations, engineering, manufacturing, and sales will be transferred from Chicago Heights to Oakley where production will be resumed as soon as possible.

Founded in 1892, Canedy-Otto was one of the oldest as well as one of the largest manufacturers in the metal drilling segment of the machine tool industry. The Canedy-Otto line of drilling equipment complements the line of medium duty "Standard" and light duty "Tray-Top" engine lathes produced and marketed by Cincinnati Lathe & Tool Company.

George Gorton III Appointed to American Management Association Production Council

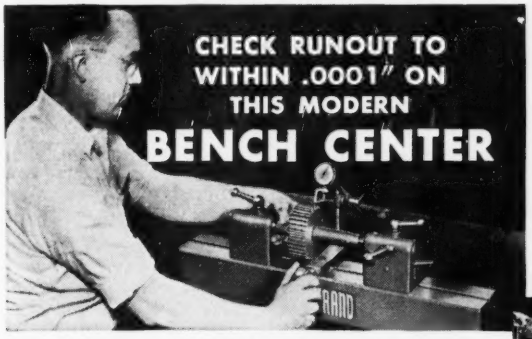
George Gorton III, executive vice president and general manager of the George Gorton Machine Co., Racine, Wis., has accepted membership on the American Management Association Production Council. This council is composed of men selected from the membership to guide the association's activities in the field of production.

Mr. Gorton comes to such a position well qualified. In addition to being executive vice president and general manager of the George Gorton Machine Company, he also holds the following positions: president Gormac Products, Racine; member of board of directors, Assoc. of Commerce, Racine; member of governing board, Racine Manufacturers' Association, Racine; president, Racine National Metal Trades Association; member of board, Vocational School, Racine; member of board of directors, Red Rock Bottlers, Inc., Atlanta, Ga., and member of board of directors, Machine Affiliates, New York City.

George Gorton III

Harry E. Sloan Completes Fifty Years with Cushman Chuck

Harry Emerson Sloan, president and treasurer of the Cushman Chuck Co., Hartford 2, Conn., recently celebrated the

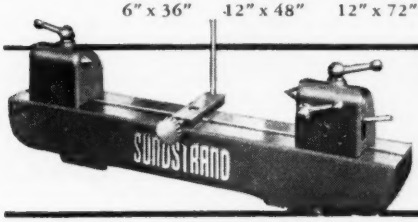


A precision tool for testing and checking parts between centers. Both heads adjustable, locked in place by lever-operated clamps. Work is held between one fixed center while spring loaded retractable center clamps work in position. Dial indicator with adjustable holder available as extra equipment.

FREE ADDITIONAL DATA covering complete specifications and additional features is contained in this bulletin. Write for your copy today. Ask for data sheet No. 591.

COMPLETE RANGE AS FOLLOWS:—

6" x 18"	12" x 36"	12" x 60"
6" x 36"	12" x 48"	12" x 72"



SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS U.S.A.

SUNDSTRAND
MACHINE TOOL COMPANY
2539 Eleventh St. • Rockford, Illinois, U.S.A.

Buy KIPP AIR GRINDERS Because

The RPM's stay up while grinding ... not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.

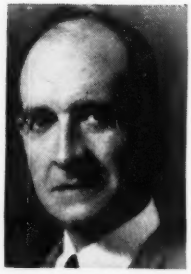
MODEL JA
50,000 R. P. M.
$42.00
IN U. S. A.

Weight 12 ounces; length 6¾ inches; chuck size ⅛ inch. Wheel guard removed for better illustration.

MADISON-KIPP CORP.
208 Waubesa St., Madison, Wis., U.S.A.

- Skilled in DIE CASTING Mechanics
- Experienced in LUBRICATION Engineering
- Originators of Really High Speed AIR TOOLS

fiftieth anniversary of his business life with the company. His activities began in the manufacturing department and have progressed through engineering and executive phases of the business. Mr. Sloan has obtained many patents for pioneering steps, both in manufacturing processes and product designs and for the development of new equipment to meet modern machine tool needs.



Harry E. Sloan

Although Cushman chucks were first manufactured in 1862 by A. F. Cushman, the present organization was incorporated in 1885 by Mr. Cushman, his brother, Eugene Cushman, and Adrian P. Sloan, father of the president.

Did You Know?---

American Machine & Foundry Co., New York, N. Y., has completed the purchase of all the properties and assets of **DeWalt, Inc.**, Lancaster, Pa., manufacturer of radial saws for light metals and other materials. AMF will continue operation of the 75,000 square foot DeWalt plant at Lancaster with the present personnel through a wholly-owned subsidiary.

— o —

The G. A. Gray Co., Cincinnati, Ohio, builder of metal planers, planer type milling machines, and horizontal boring machines, has announced the appointment of the **C. F. Bulotti Machinery Co.**, 475 Fourth St., San Francisco 7, Calif., as exclusive distributor in northern California for its entire line of machine tools.

— o —

The **Victor Equipment Co.**, San Francisco, Calif., producer of gas welding and cutting equipment and allied products, has announced the purchase of the business and assets of **Mills Alloys, Inc.**, 11320 S. Alameda St., Los Angeles, Calif., manufacturer of blasting nozzles and tungsten carbide hard-surfacing rods. The manufacturing facilities purchased by Victor will continue to be located at the site now occupied by Mills Alloys and will be designated as the Alloy Rod and Metal Division of Victor Equipment Company.

Did You Know?---

The Butterfield Division of Union Twist Drill Co., Derby Line, Vt., manufacturer of taps, dies, reamers, and other industrial cutting tools, has announced the appointment of **F. P. Rogers,** 520 First Ave. S., Seattle, Washington, as its representative in Oregon and Washington.

— o —

Curtis D. Cummings, for 12 years associated with SKF Industries, Inc. as a sales engineer and manager of the industrial sales department, has been appointed sales manager of The Allison Co., 251 Island Brook Ave., Bridgeport, Conn., manufacturer of abrasive cutting wheels.

— o —

Elias C. Atkins III has been promoted to assistant to the vice president of E. C. Atkins & Co., Indianapolis, Ind., moving up to this position from that of manager of mill sales. He will make his headquarters at the company's factory branch at Portland, Oregon.

— o —

Dudley W. Moor, Jr., former vice president of American Mat Corporation, Toledo, has been elected president, succeeding **E. M. Belknap** who died recently.

George Robert York, 37, sales engineer in the Chicago office of The Bullard Co., Bridgeport 2, Conn., died recently after an association with the company of almost 13 years.

— o —

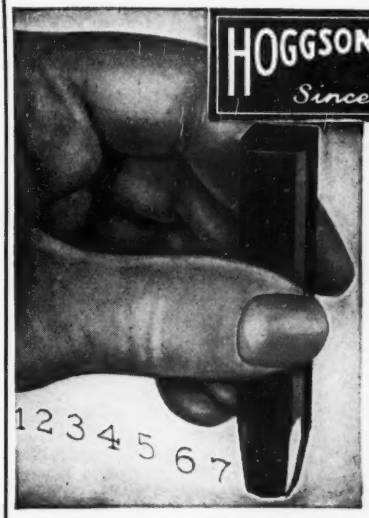
According to an announcement made by the Clearing Machine Corp., Chicago, Ill., press manufacturer, **Francis J. Sehn,** previously chief die engineer for the Fisher Body Tank Division, has been added to the staff of Clearing's Detroit office as a sales engineer.

— o —

The Surface Combustion Corp., Toledo 1, Ohio, has announced that **Ralph W. Elmenthaler** has joined its industrial advertising staff as liaison engineer in which capacity he will prepare catalogs and publicity material on industrial furnace installations.

— o —

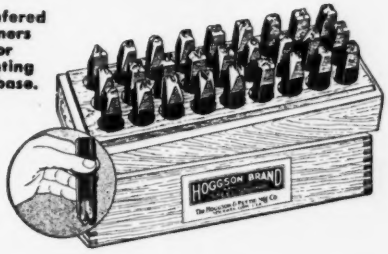
The Lapointe Machine Tool Co., Hudson, Mass., producer of broaching machines and broaches, has opened new enlarged offices at 2400 W. Madison St., Chicago, Ill., which will serve as regional headquarters for several Lapointe sales and service engineers, three of whom have already been appointed and are now in the territory: **James W. Dopp, George A. Hodges, Jr.,** and **Richard S. Davis.**



HAND-CUT STEEL STAMPS Letters & Figures

Deep, hand-cut letters in special-formula steel — result of 90 years of die making—assure clean impressions and long service. Face of stamp is angled for extra strength. Ideal for parts and tool marking and numbering. Also made in reverse for marking molds and dies. At mill supply houses.

Chamfered corners for locating the base.



HOGGSON & PETTIS MFG. CO., New Haven, Conn.

Did You Know?---

T. W. Gabriel, formerly sales manager of the Ohio district for Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has been appointed general sales manager of the firm. **Macon Jordan** has been named sales manager of the Ohio district, succeeding Mr. Gabriel, and **R. C. Wilkison** has been appointed carbide supervisor for the Detroit district.

— o —

The C. A. Norgren Co., Denver 9, Colo., manufacturer of oil-fog lubricators, air filters, pressure regulators, valves, hose couplings and assemblies, has appointed **Ellis W. Akin** as authorized representative, with headquarters in Kansas City. The area served by Mr. Akin includes western Missouri and eastern Kansas from Springfield to Wichita.

— o —

The Whiton Machine Co., New London, Conn., has appointed the **Anderson & White Supply Co.,** 2910 W. Armitage St., Chicago, Ill., as its agent to handle the sale of lathe chucks and centering machines and the **Standard Equipment & Supply Co.,** 534 Michigan Ave., Hammond, Ind., as its agent to handle the sale of lathe chucks.

W. L. Reynolds Co., 502 W. Franklin St., Baltimore, Md., has been appointed as an additional authorized distributor in Baltimore and vicinity by the Carboloy Company, Inc., Detroit, for its standard tools, standard blanks, carbide-tipped masonry drills, and diamond impregnated carbide wheel dressers.

— o —

The Westcott Chuck Co., Oneida, N. Y., has announced the appointment of **Herman H. Hobelmann,** 744 Harrison St., San Francisco, Calif., as its district representative in the states of California, Oregon, and Washington; also in the Reno district of Nevada.

— o —

Announcement has been made by **Cone-Drive Gears** (Division of Michigan Tool Company), Detroit, of the purchase of the 12th Street, Traverse City, Michigan plant of Parsons Corporation. The plant, which contains approximately 40,000 square feet, will be used soon for the manufacture of "Cone-Drive" gears and speed reducers.

— o —

Edward C. (Ted.) Bailey has announced the termination of his connection as eastern district manager of the Greenfield Tap & Die Corp., Greenfield, Mass., after an association of over 31 years.

THE QUAKER OATS CO.,
Maintenance Shop, Cedar Rapids, Iowa, reports: "We balance hammer mill rotors, fan wheels, pulleys, armatures, etc., on our "Bear" Model 375-R Dy-Namic Balancing enables us to prevent excessive vibration in valuable machinery and premature wear of bearings and equipment.
CASE REPORT No. 54 from a series of actual cases recording the successful application of "BEAR" DY-NAMIC BALANCING to Industry
DY-NAMIC BALANCING
"EARNS ITS OATS" AT QUAKER OATS!
"Bear" Dy-Namic Balancing Machines are "naturals" for maintenance applications as well as for manufacturing! Adjustable columns and rollers permit a wide variety of applications and require only minimum time for set-up changes.
FREE! Dy-Namic Balancing Manual
Hundreds of applications..case studies ..illustrations..Dy-Namic Balancing tables. GET YOURS TODAY! Write "Bear" Mfg. Co., Dept. M-85, Rock Island, Illinois
BEAR
STATIC AND DY-NAMIC BALANCING MACHINES
Trade Mark Registered U. S. Patent Office

Did You Know?---

Lyon Metal Products, Inc., Aurora, Ill., has announced the opening of a new warehouse at 1755 Utah Ave., Seattle, Washington.

— o —

C. Neil Norgren, assistant general manager of the C. A. Norgren Co., Denver, has been elected to the board of directors of the Manufacturers' Association of Colorado.

— o —

Carl B. Post and **George V. Luerssen** of The Carpenter Steel Co., Reading, Pa., were recently awarded a certificate of merit for their work in the preparation of a paper entitled "The Interaction of Liquid Steel with Ladle Refractories."

— o —

Frank Willmott, Chicago district sales manager of E. W. Bliss Company, retired recently after 24 years of service with the company. **Bernard E. Meyer,** who joined Bliss in 1925, has been named to succeed Mr. Willmott as Chicago district sales manager.

— o —

The Bullard Machine Co., Bridgeport 2, Conn., manufacturer of machine tools, has announced the appointment of **H. Edward Neale** as Chicago district representative working in conjunction with Marshall & Huschart Machinery Co., 571 Washington Blvd. at Jefferson St., Chicago, Ill. Mr. Neale is taking the place of George York, recently deceased.

— o —

The Whiton Machine Co., New London, Conn., has announced the appointment of the **Valley Supply & Tool Co.,** Aurora, Ill., and the **Bansbach Machinery Co.,** Chicago, Ill., as agents to handle the sale of lathe chucks, centering machines, special purpose high production milling machines, and gear cutters in the Chicago area.

— o —

Independent Pneumatic Tool Co., Aurora, Ill., manufacturer of Thor portable power tools, has announced the appointment of **Eugene C. O'Connell,** formerly service engineer in the Los Angeles branch, as manager of the San Francisco sales and service branch and **Clarence H. Gabriel,** formerly service engineer in the Salt Lake branch, as manager of the Denver branch.

— o —

Kraus Design, Inc., designer of automatic parts handling equipment, has moved to larger and more efficient quarters at 950 Exchange St., Rochester 8, New York.

Rouse

NEW HAND MILLER ATTACHMENTS MAKE MILLING SMALL PARTS Faster, Safer . . .

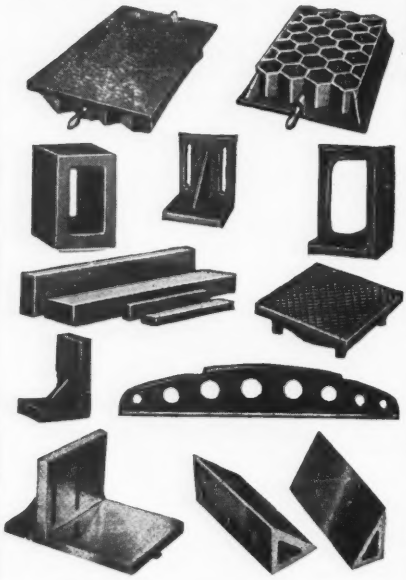
The new Vise's specially slotted removable jaw enables it to hold odd shaped pieces, considerably increasing the Hand Miller's production. The new Safety Cutter Guard makes hand injuries virtually impossible.

The Rouse Hand Miller is an efficient, high speed, ball bearing, motor-driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials. It mills small parts fast—accurately—inexpensively, eliminating costly set up time and making it possible to use ordinary, inexperienced help.

WRITE FOR ILLUSTRATED CIRCULAR

H. B. ROUSE & COMPANY
2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

EXACT MEASUREMENTS REQUIRE PRECISION TOOLS



Accuracy of measurement depends on the precision of the measuring tools. Provide your Shop and Inspection Department with dependable and proper Inspection Tools. MEEHANITE METAL TOOLS, made to close tolerances, are furnished in many types:

Surface Plates — Box Parallels
Slotted Angle Plates
Universal Right Angles
Flat Parallels — Lapping Plates
Toolmakers' Knees — Straight Edges
Masterangle Plates — Angle Attachments

Send for Bulletin

WE RESCRAPE SURFACE PLATES LIKE NEW

ACME TOOL CO.

69 W. BROADWAY NEW YORK 7, N. Y.

Did You Know?---

A number of important changes in its sales organization have been announced by Standard Pressed Steel Co., Jenkintown, Pa., manufacturer of socket screw products, self-locking nuts, and steel shop equipment. **George A. Gade,** former district manager of the SPS Detroit office and warehouse, has been appointed regional sales manager in charge of Midwest territories with headquarters in Detroit. Succeeding Mr. Gade as Detroit district manager is **Francis J. Kinsella,** sales representative in the area for a number of years. **David J. Hurford,** Cincinnati area district manager, has been named special representative for aircraft products in the West Coast area. **William C. Harper,** former SPS representative in the New England area, has been selected for the Cincinnati post. **A. Clayton Graham** replaces Mr. Harper in the New England territory.

— o —

According to an announcement made by the Hydro-Line Mfg. Co., Rockford, Ill., manufacturer of air and hydraulic cylinders and special machinery, the **Austin-Hastings Co., Inc.,** 226 Binney St., Cambridge, Mass., has been appointed exclusive representative for Hydro-Line products in the New England states excluding Connecticut, and **Hydro Pneumatics, Inc.,** 95 Liberty St., New York, N. Y., as exclusive representative for Metropolitan New York and northern New Jersey.

— o —

Morse Twist Drill & Machine Co., New Bedford, Mass., has contracted exclusive rights (for every type of tool made by Morse) to the "Electrolizing" process of fortifying cutting edges with a hard, yet ductile, alloy that is said to impart sharply increased wear resistance.

— o —

The Falcon Tool Co., Detroit 5, Mich., has announced the appointment of **Leroy E. Rawson** as general sales manager. Mr. Rawson was formerly associated with the Barber-Colman Company, The Illinois Tool Works, and The Goddard Co.

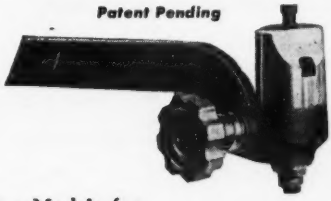
— o —

B. C. Ames Co., Waltham, Mass., manufacturer of micrometer dial indicators and micrometer dial gages, has appointed **Hal W. Reynolds Co.,** 2902 Euclid Ave., Cleveland, Ohio, as exclusive sales representative in northern Ohio.

Mention MODERN MACHINE SHOP when writing to advertisers.

Monarch Precision SHAPLANE Radius Tools

Patent Pending



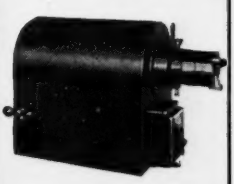
Five Models for

LATHES, SHAPERS, PLANERS, AND BORING MILLS.

RANGE ⅛" TO 3" RADIUS (MODELS ALSO AVAILABLE FOR CONVEX CUTTING, AND CONCAVE RADII TO 6" ON PLANERS, ETC.)

C. B. TEETER
Tool Room Specialties
4470 Oakenwald Ave., Chicago 15, Ill.
Phone Drexel 3-3571

50% INCREASE PER MAN HOUR

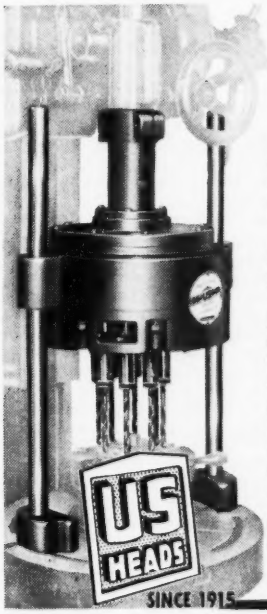


SCHAUER speed lathes

Users report 50% to 90% more production in *polishing, lapping,* or *burring* by use of Schauer Speed Lathes. Find out how you can use these low-cost, high-production machines for your secondary finishing operations. "Save with Schauer." Write for Catalog 480.

SCHAUER MANUFACTURING CORP.

• ORIGINATORS OF TODAY'S SPEED LATHES
2060 Reading Rd., Cincinnati 2, Ohio, U.S.A.



Designed for You!

ADJUSTAFIX MULTIPLE SPINDLE DRILL HEAD

This head is designed to reduce drastically multiple drilling costs by eliminating expensive changes in set-up from job to job.

As much as 90% of the drill head can be left intact, yet a complete engineering change-over is accomplished by simply changing the drill pattern plate and relocating spindles on the new pattern plate to conform to the new design.

The spindle and idler constructions are entirely separate assemblies both being self contained. For this reason, the use of compound gears on the idler shaft gives exactly the tool speed required for a given job. No change of gearing is necessary in the main drive box when tool speed is changed.

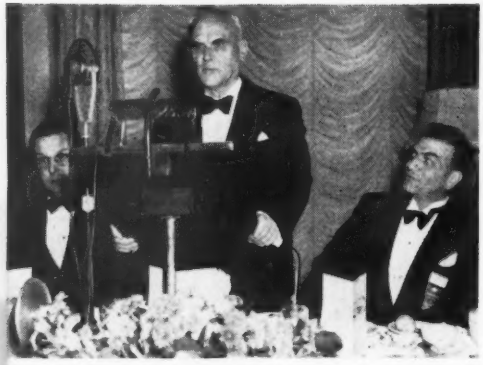
THE ADJUSTAFIX MULTIPLE SPINDLE DRILL HEAD can be easily installed on the machines you are now using, and can be used not only for drilling, but for tapping, reaming, spot-facing, boring, counterboring, and milling operations as desired.

ALL ADJUSTAFIX MULTIPLE heads have fully automatic lubrication for either horizontal or vertical operation.

UNITED STATES DRILL HEAD CO. 616 Burns Street,
CINCINNATI 4, OHIO

• *We manufacture all types of multiple spindle, fixed center, adjustable and lead screw tapping heads.*

Canadian Minister of Trade and Commerce Addresses Tool Engineers at Montreal Meeting



(Left to Right) H. E. Conrad, ASTE Executive Secretary; C. D. Howe, Minister of Trade and Commerce, and R. B. Douglas, ASTE President.

SPEAKING at the annual dinner of the American Society of Tool Engineers meeting in Montreal, Canada, October 29, 1949, The Right Honorable C. D. Howe, Minister of Trade and Commerce stated that "Canadian industry, like that of the United States, has surged forward during the war years, partly at least as a direct result of war demands, and in postwar years, because of the physical destruction in Europe, and the virtual elimination of the industry of Germany and Japan. Canada is now in third place among the nations of the world in exports of manufactured goods, following the United States and the United Kingdom. In per capita terms, Canada's exports are much larger than either the United States or the United Kingdom. In short, Canada has come of age, industrially, within the past eight years.

"The spectacular growth of our manufacturing capacity applies to established prewar industries, such as motor vehicles, railway rolling stock, agricultural implements, and textiles, as well as to other industries which were of minor importance before 1939. Examples of the latter group are aluminum, chemicals, plastics, aircraft, machine tools and electrical apparatus. During the war years, entirely new products, such as synthetic rubber and synthetic textiles, came into production. Our primary iron and steel industry was expanded by 70 per cent.

"Our prosperity in Canada and our economic welfare depend upon conditions existing both in the United States and in the United Kingdom. These two countries take 70 per cent of our exports and supply 80 per cent of our imports. We could not isolate ourselves successfully from either one of them, even if this seemed desirable. Our commercial destiny is closely linked with both. This relationship is by no means a one-way street. The Canadian market is one of the largest import markets in the world, and Canada is the largest and most important customer for both the United States and the United Kingdom.

"Thus we stand with one foot in the sterling area and the other foot in the dollar area. In our own interest, and apart altogether from political considerations, we must try to prevent these two great trading areas being divided into two separate and divergent groups. It must be our policy to keep the channels of finance and trade open between the sterling area and the dollar area. Our difficulty at the moment is to bring the trade of Canada with its two principal customers into balance.

"In the year that ended on September 1 last, we sold to the United Kingdom goods to the value of about 700 million dollars, and imported from the United Kingdom goods to a value of 325 million dollars. In the same year, we sold to the United States goods to the value of one billion 550 million dollars, and we imported from the United States goods to the value of about two billion dollars. Our excess of exports to the United Kingdom was paid for in part by a Canadian loan, and in part by Marshall Plan dollars allocated to the United Kingdom. Obviously, our policy must be to increase our imports from the U. K. in order to bring about a better balance between exports and imports.

"Our adverse trade balance with the

United States represents a drain on our dollar resources that must be kept to manageable proportions. Either we must export more to the United States, or alternately, buy less in that country. Of course we prefer an expansionist policy to a restrictive policy, in both cases.

"American industry has a very considerable stake in Canada in the form of branch plants. By the end of 1948, the value of United States direct investments in Canada totalled 2 billion 700 million dollars, of which one billion 600 million dollars were invested in Canadian manufacturing concerns, controlled in the United States. Total United States investments in Canada are about 5 billion dollars, and it may be of interest that this investment pays a bigger cash return to American investors than all other American investments abroad put together. Some 2,000 American companies and branches are now established in this country, of which over 1,000 are engaged in manufacturing.

"We hope that more American companies will avail themselves of the favorable conditions for investment in Canada that follow the recent exchange devaluation. Such a move would be welcomed here, if only as a means of correcting our unbalanced U. S. dollar position.

"It is important that Canada and the United States shall continue to make progress industrially, making full use of the best technical information available on either side of our common border. In war and in peace, our problems are common problems. We have learned to depend on each other, and I believe that neither of us has had reason to regret having done so. It has been our habit to make the resources of one country available to the other country, and most of us feel that this has proved to be good policy and one that we will do well to foster. It is this common mentality, and common outlook, that has bound us together in the past, and that offers so much hope for the future. I sincerely hope that your meeting in Montreal has been a success, and an occasion that will be repeated in the not too distant future."

Cutting Tools. Standard Tool Co., Cleveland 4, Ohio, has published a 72-page two-color catalog (No. 49) providing illustrated, descriptive, and complete tabular information on its line of Shield Brand tools, including various types of twist drills, reamers, counterbores, milling cutters, end mills, hobs taps, dies, and special tools. A discount sheet on the different tools is provided with the catalog. Copy free.

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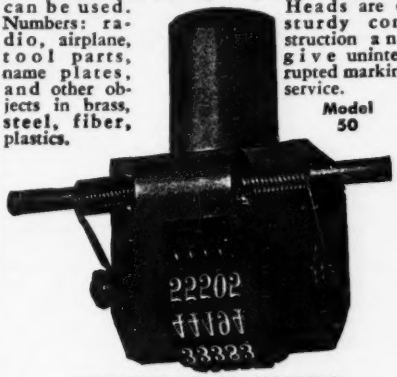
Automatic indenting numbering head for consecutive or repeat numbering. 1/32" up to 3/8" high figures can be furnished in sharp face Gothic or shaded Roman figures. Prefix or suffix letter wheels. Bench, foot, or power presses can be used. Numbers: radio, airplane, tool parts, name plates, and other objects in brass, steel, fiber, plastics. Heads are of sturdy construction and give uninterrupted marking service.



Model 50

IMPROVED TYPE HOLDERS
For Stamping into Metal, Etc.

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.

Write for Bulletin MS23H

Steel Type

NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

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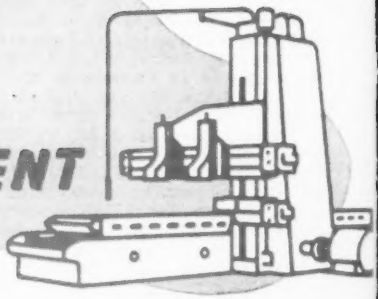
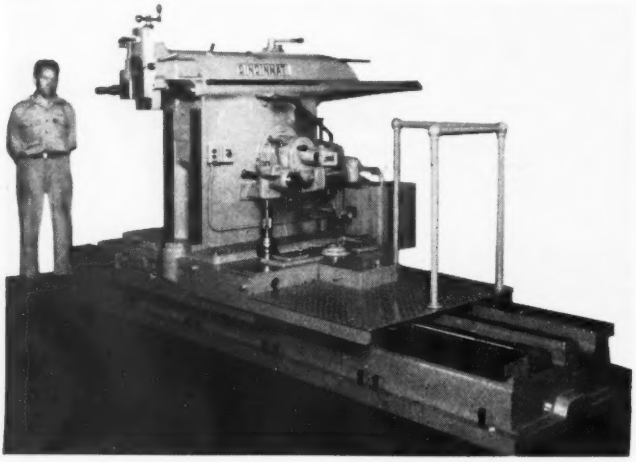


Traveling Shaper

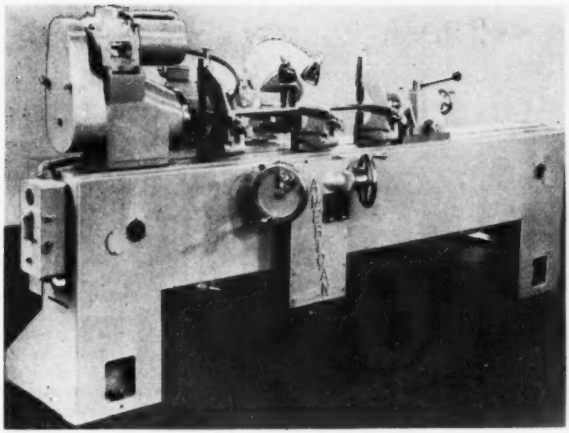
The accompanying illustration shows a traveling shaper developed by The Cincinnati Shaper Co., Cincinnati 25, Ohio. The machine, designed primarily to meet the requirements of a Swiss motor generator manufacturer, can also be used by other manufacturers of parts requiring shaping over a large area of travel. Employing the method of travel of a boring mill, the machine is capable of shaping a surface requiring up to 8 feet table travel without the need for resetting the workpiece. By lengthening the ways, even longer table travel is possible.

The shaper has a 36-ram stroke and is provided with either hand or power feed and built-in power rapid traverse. The unit is equipped with two complete automatic oiling systems, one for the shaper ram, feed and drive mechanism, and one for the saddle and ways on which the shaper rides. A Bijur foot-operated pump for re-establishing an oil film after the machine has been idle is also included. A full length scale in the center guide bearing with vernier and vernier light and magnifying glass allows for very accurate settings. Ram speeds available range from 8 to 102 strokes per minute. The toolslide has a 9-inch vertical adjustment and power feed. The operator rides on a platform attached to the saddle.

Specifically, the shaper illustrated is designed to machine mating steps in the ends of cast steel generator half rings 20 feet in diameter and weighing 7 tons. Approximately 8 feet of the ends of two semi-circular rings are shaped on a single setup. The machine can also be used for shaping cross slots in press beds or long die shoes or for machining long, interrupted surfaces that do not lend themselves readily to planing.



Cincinnati Traveling Shaper



American Cylindrical Broach Sharpening Machine

Broach Sharpening Machine

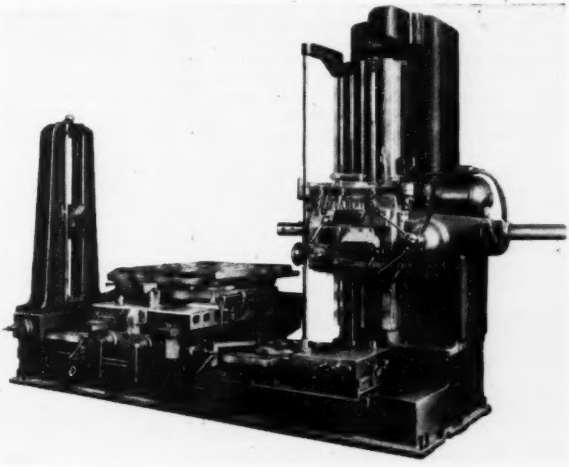
The American Broach & Machine Co., Ann Arbor, Mich., has developed a cylindrical broach sharpening machine which allows for the mounting of the broach between centers on a stationary bed and the traversing of the grinding wheel from tooth to tooth for fast, accurate resharpening. The machine can be used to resharpen internal broaches of the involute spline, helical spline, hexagon, cam shaped, irregular formed, seration, and combination type.

Designed to occupy a minimum of floor space due to the stationary bed mounting for the broach, the machine features micrometer dial control wheels for the lateral traverse of the carriage and infeed of the grinding spindle; variable speed drive for the rotation of the broach; antifriction bearing rollers; and hardened and ground carriage mounting rails. The unit is available in two models; namely, the RBS-9-84 for broaches up to 9 inches in diameter and up to 84 inches in length RBS-9-60 for broaches up to 9 inches in diameter and 60 inches in length.

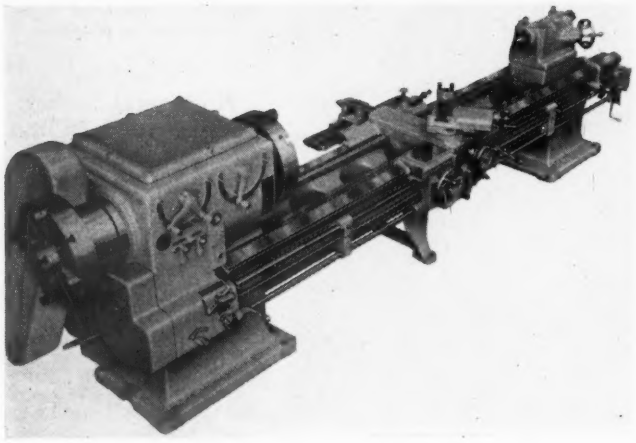
Horizontal Boring, Drilling and Milling Machine

A horizontal boring, drilling and milling machine with built-in rotary table has been placed on the market by The Cincinnati Gilbert Machine Tool Co., 3360 Beekman St., Cincinnati 23, Ohio. Other features of the machine include a single hardened 3½-inch diameter spindle with maximum speed of 1,420 r.p.m.; built-in reversing motor; anti-friction bearings throughout, with the spindle sleeve mounted on preloaded zero precision ball bearings; hardened ways for the bed; pressure lubrication to all moving parts; centralized control for all spindle speeds, feed changes, and feed selection; power rapid traverse, starting, stopping and reversing of spindle and all feeds.

The table unit has a cross-feed and power rapid traverse on its saddle. The table top is clamped to its base by a 47-inch diameter ring clamp acting on an angular surface of the table top. This clamp is closed by a screw which in turn is actuated by a ratchet handle. Its



Cincinnati Gilbert Built-In Rotary Table Type Horizontal Boring, Drilling and Milling Machine



LeBlond 20-Inch Hollow Spindle Lathe

action, the manufacturer claims, will not squeeze the oil from the flat ways.

The table top is mounted on a very large diameter anti-friction bearing and is centered on a large diameter king pin which is equipped with opposed tapered roller bearings. The flat ways are lubricated by a pressure system, thus making it extremely easy to revolve the table top by hand with heavy loads imposed upon it. The table top has a working surface of 44 inches in diameter or 44 inches square and is surrounded by a coolant trough. The cutter coolant passes through the table to the base and then through the saddle to the bed; thus, the coolant is confined to the machine. The table top is graduated to read in ½ degrees and can be equipped with a precision indexing device.

The machine can be supplied with the table arranged for (1) hand revolving, (2) hand revolving through a Hindley type worm and wormwheel, and (3) 16 power feeds and rapid revolving of the table top. (In this case the power is taken from the main feed mechanism of the machine.) The spindle head, column, bed and saddle and the boring bar support are standard units used on the regular rectangular table type horizontal boring, drilling and milling machine.

Hollow Spindle Lathe

A hollow spindle lathe with 9-inch bore has been announced by The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio. Rated as a 20-inch size, the lathe has a 27-inch swing over bed and carriage wings and is available with center distances starting at 48 inches. The machine is equipped with an 18-speed geared headstock and is arranged for a 20 h.p. main drive motor. The 18 spindle speeds range from 10 to 362 r.p.m. An electric brake with apron spindle control is said to provide an efficient means for quickly starting, stopping, and reversing the spindle.

The quick-change feed box of the lathe is totally enclosed and automatically lubricated and provides for 63 feed and thread changes. Other features of the machine include hardened and ground steel bed ways (front and rear), one-piece apron with positive jaw feed clutch, thrust lock tailstock, and so on.

Drilling and Tapping Machine

The Kaukauna Heavy Duty Universal Drilling and Tapping Machine now being distributed by the Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago 6, Ill., provides a 97-inch radial reach with the spindle in a vertical position. The standard machine with base column height is said to drill holes at any point in a range from 18 to 134 inches above the floor with the spindle in a horizontal position, and is capable of performing radial, horizontal, or angular operations, such as drilling, tapping, boring, spot-facing, or reaming, on a production basis.

The machine can be supplied for stationary fixed-location applications or for use as a fully portable unit with stabilizing spreader arms, leveling jacks, and lifting bail. It has a 4-inch diameter nitrided spindle with 18 inches of manual and power feed, either No. 5 or No. 6 Morse taper hole, and nine speeds in a choice of three ranges from a minimum of 25 r.p.m. to a maximum of 800 r.p.m. with a spindle drive power range from 10 to 20 h.p. The spindle head swivels 360 degrees on a trunnion which rotates 180

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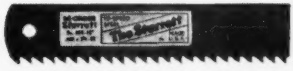

HIGH SPEED STEEL 18-4-1 Tungsten all hard blades for light and heavy power sawing to assure fast production on high alloy metals, stainless steel, phosphor bronze, tool steels, chrome steel, Monel metal and the like.

SAFE-FLEX for hand sawing — a high speed steel blade with hard edge and flexible back, a combination that makes it virtually unbreakable on the toughest hand sawing jobs.

STANDARD Flexible Back, All Hard and "Semi-Flex" in the right size and teeth per inch for hand sawing jobs of all sorts. Fast cutting, long lived, thoroughly reliable.

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METAL CUTTING BAND SAWS with hard edge and flexible back, available in 10 widths, 3 gauges and 8 pitches, in coils of any desired length, or cut to length and welded ready to use.

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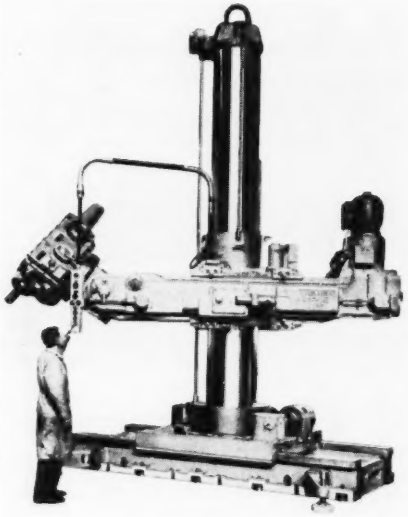
degrees on the machine rails, thus permitting the spindle to be positioned for angular, compound angular, horizontal, or vertical operations in any combination of vertical, horizontal, and radial positioning movements. Both swiveling units are power driven, and the rails supporting the swiveling spindle head and trunnion have a power driven horizontal traverse of 36 inches for rapid tool positioning with convenient handwheels for ease in final accurate positioning.

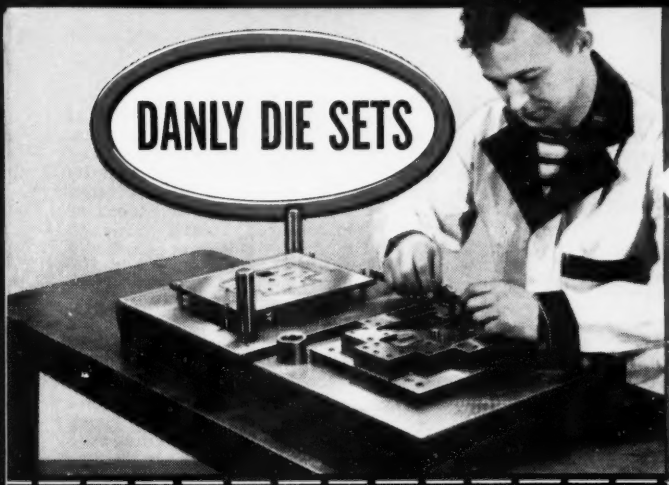
The entire rail unit is provided with 60 inches of vertical movement on the column with power rapid traverse up and down. The column is 22 inches in diameter, can be swiveled through 360 degrees to permit machining operations at any point around the machine, and is provided with an electric swivel clamp which is said to eliminate off-position creep. The column base is supported on a heavy runway which provides 48 inches of horizontal movement by power with both rapid traverse and inching in either direction. Enclosed electrical collector rings are mounted on the column base to transfer power to the rail slide unit and eliminate cable wind-up or interference when the column is rotated.



Kaukauna Model 140-U Portable Horizontal Drilling and Tapping Machine

Nine spindle speeds and nine spindle feeds are each selected by dual rotary se-

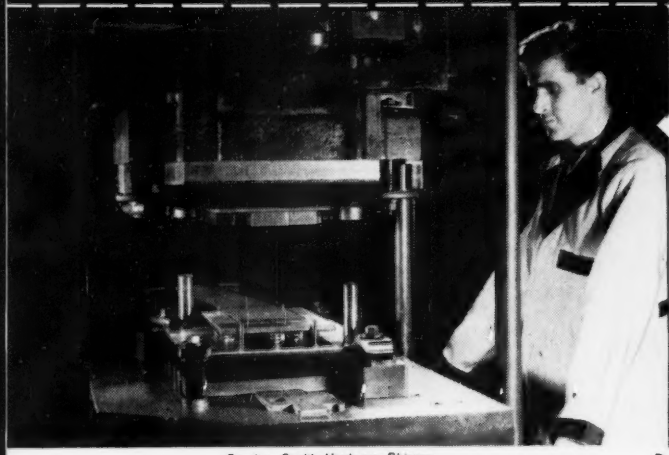
DANLY DIE SETS



less time

IN THE DIE SHOP

Reliable Danly precision makes die assembly quicker and easier . . . possible reworking of die sets to make them square and true is eliminated. Precision leader pin and bushing fits assure accurate die closure and protect delicate die components. Danly Die Sets mean better dies in less time!



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ON THE PRODUCTION LINE

Hardened, ground and lapped leader pins resist wear . . . accurate die relationship minimizes punch shearing and die breakage. Precision Danly Die Sets justify die maker's precision in the press setup, preventing premature die wear. Danly Die Sets mean more parts per grind!

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Danly precision makes every Danly Die Set a reliable foundation for the finest die work. And in addition to the performance advantages they assure, Danly Die Sets are quickly available, too, from a nation-wide system of completely stocked assembly branches.

Large or small, standard or special, there's a Danly Die Set to meet every tooling need. Just contact your nearest Danly branch for fastest delivery of the best in die sets.

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DANLY PRECISION DIE SETS . . . STANDARD AND SPECIAL

OVER 25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

lector levers with direct reading indicator dials showing the speed or feed engaged. Additional travel of any of the various units can be provided to increase the coverage range as may be required to meet any particular application.

Heavy Duty Lathe

The Springfield Machine Tool Co., Springfield, Ohio, has introduced a 16-inch heavy duty lathe designated as the Model S. The machine has an unusually heavy spindle with 24 speeds which is mounted on three heavy duty bearings. A bearing at the middle of the spindle adds rigidity. Ball or roller type spindle bearings are optional. The hole through the spindle can be slightly in excess of 2 inches when required. Heavy hardened and ground gears provide a speed range of 15 to 1,000 r.p.m., with higher or lower ranges available on order. A multiple disc, wet type combination clutch and brake operating in a bath of oil controls the spindle. Mechanical reverse to the spindle can be obtained when required.

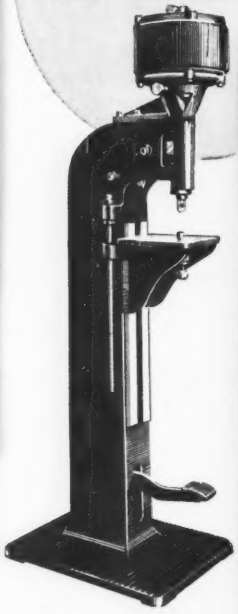
The levers located convenient to the operator control the entire 24 speed changes. One lever has two shifts; the other lever controls 12 gear changes. The shifter mechanism permits shifting directly from one speed to any other speed without the necessity of passing through intermediate points.

Lubricating oil for all bearings and gears in the head is contained in a sump in the cabinet leg from which an automatic pump delivers the oil to the entire mechanism of the lathe. A self-cleaning oil filter is conveniently located in a recess in the front of the cabinet leg.

The combination of quadrant gearing and 60 feed and thread gearbox provides for a quick changeover from standard operations to metric, module, and diametral pitch setups. In addition, the 60 feed box includes all standard threads; optional ranges have 11½ and 27 pitch among others.

The extra wide and deep bed utili-

LINLEY



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SEND SAMPLES
We will gladly rivet sample parts and return them for your inspection.

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Big Shaper Performance
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The SHELDON 12" Back-Geared Shaper is neither too big, nor too small. It is just right for most shaper work in most tool rooms and shops.

In weight, design features, capacity and performance, it is a "big shaper." In price, operating cost and floor space, it resembles a "small shaper." It is the logical first shaper for the small shop and installations in large plants.

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No. 8000
12" Back-Geared
SHAPER

Write for Catalog that shows, describes, and gives specifications of this shaper and its available accessories.

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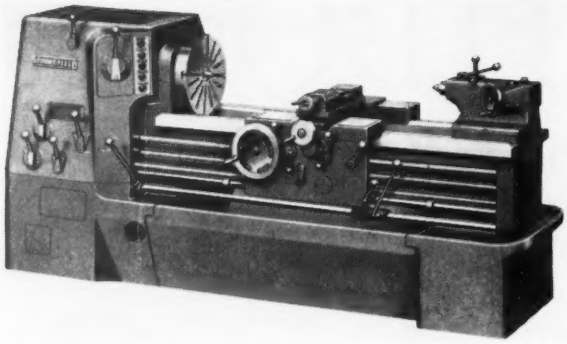

Springfield Model S Lathe

zes an equilateral triangular type of girthing which provides for maximum chip clearance through bed, as well as unusual rigidity. The carriage and apron are of generous cross-section for rigidity and large way areas. The carriage and bridge not only bear on the front vee bed way and a flat way at the back of the bed, but additional rigid support is afforded by locating a bridge bearing on the flat tailstock way at the front. All bed ways and cross slide ways are automatically lubricated, and the cross slide ways are completely guarded from chips.

Extremely large nonferrous half nuts engage the heavy lead screws. Both the lead screw and the large feed rod are the constantly rotating type to minimize sagging and the collection of dust, chips, and dirt. The heavy duty compound rest screw and cross slide screw are so located as to eliminate interference between the large micrometer dials. The compound swivels 360 degrees, with the swivel guarded from chips.

A unique tailstock with handwheel offset 50 degrees toward the operator has two-speed action for slow drilling feeds and rapid advance. Both heavy duty clamping and quick acting light duty clamping are provided. The tailstock spindle clamp and hold-down clamp have convenient adjustments. An oil reservoir not only lubricates the

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ABRASIVE
ACCURACY BOOSTS PRODUCTION

graduated barrel and nut, but also the tailstock bed ways. Standard and tang slot type barrels are furnished.

The full depth chip and coolant pan is completely independent of the machine. It rests on ball casters and can be easily rolled out for cleaning or positioning for the operator's convenience. The coolant pump is mounted at the rear of the pan and has quick disconnect type hose and electrical couplings.

Power rapid traverse and main drive motors are mounted in the cabinet leg which includes a removable panel that provides free access to the motors. All motor controls and disconnects are contained in a large covered cavity at the rear of the head. Terminal block type wiring provides an easy means of checking out circuits. Remote control push buttons are located in a recess at the front of the head to afford the operator immediate and convenient access to the control of the motors.

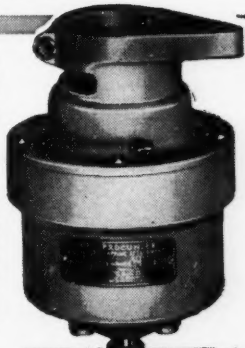
A complete line of toolroom and engine lathe accessories and attachments is available for the Springfield Model S, including reproducing, profiling, contouring, and other units.

Thread Miller

Employing a multiple ring tooth cutter for milling straight and tapered, inside and outside, right and left-hand threads, the Wickes Model 30 Smalley-General Thread Miller shown herewith has been developed by Wickes Bros., Saginaw, Mich. A taper up to 4 inches per foot and having threads from 1 to 28 per inch can be produced on the machine. Large diameter work is said to be easily handled with the 10½" or 15½-inch hydraulically operated three-jaw wedge chuck. The machine may also be equipped with a four-jaw independent chuck or a faceplate with boring mill jaws.

Rigidly constructed, the machine provides a range of milling spindle speeds from 50 to 300 r.p.m. and a range of main spindle speeds from 1.52 to 41 minutes per revolution for milling and 3.08 to 83

TAPS LAST LONGER on this tapping head!



Taps do last longer on this Procunier High Speed Tapping Head. They stay sharper longer, are held truer, do a more accurate tapping job for a greater length of time. Broken taps and "chewed" tap shanks are reduced to the barest minimum. *Here's why:* the "Tru-Grip" tap holder keeps the tap rigid and in true alignment by the round of its shank, drives it by the square . . . tap shanks are never "chewed up"; the Procunier friction clutch helps operators avoid costly tap breakage at higher speeds. These and many other unique Procunier features *save you money* every single day they are in use! Write for full details and prices *today*.

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Please send your illustrated brochures which give complete prices and specifications on Procunier High Speed Tapping Heads and Machines.

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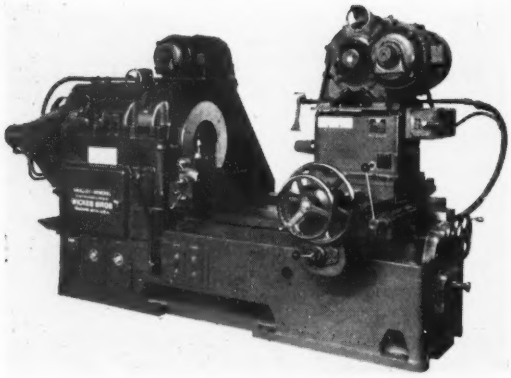
PROCUNIER "TAP SAVER"

The exclusive "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed up" tap shanks. Holds the tap *true*.



Wickes Model 30 Smalley-General Thread Miller

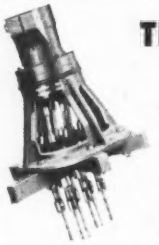
Various parts subject to wear, such as the lead screw nut, are provided with corrective adjustments. The design of the gearbox allows for the easy dismantling of any shaft. Special attachments, such as outboard bearings for long work, a turning and facing slide, and a tailstock, are also available.

r.p.m. for turning. Conveniently located operating controls and easily accessible quick-change gears are said to reduce chucking and change-over time to a minimum.

To reduce maintenance, the worm and gear drive to both spindles and the gearbox are immersed in a bath of oil. The hardened steel ways on the cast iron bed are power lubricated. All shafts and spindles operate in anti-friction bearings.

Rotary Hearth Forge Furnace

A portable rotary hearth forge furnace designed to assure a steady supply of clean forgings, uniformly heated, ready for the forging hammer, has been built by the W. S. Rockwell Co., 200 Elliott St., Fairfield, Conn. The furnace is said to be capable of producing up to 900 lb. of forgings per hour heated to 2,100 deg. F. The work is charged and discharged through a single slot of 9 inches wide x 2½ inches high which has a water cooled



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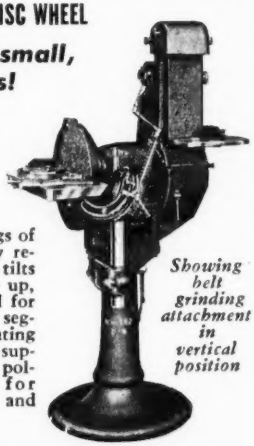
"Oliver" Grinder

WITH 15-IN. DISC WHEEL

for those small, tough jobs!

A valuable machine for grinding light and medium metals, and for polishing. Abrasive facings of 15" disk easily replaced. Table tilts 45° down, 25° up, and is grooved for angle, circle, segment, duplicating gauges. Can be supplied with belt polishing unit for straight-line and general work.



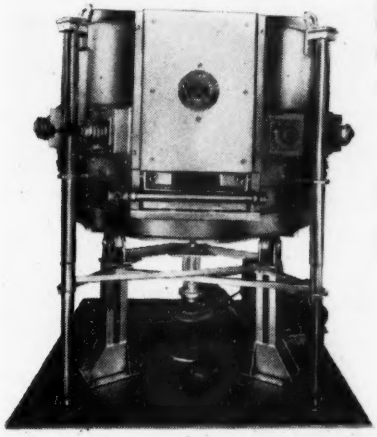
Showing belt grinding attachment in vertical position

Write for Bulletins 182D and 182DB

OLIVER MACHINERY COMPANY
Grand Rapids 2, Mich.

sill that is said to prevent the heat from creeping back along the bar.

According to the manufacturer, the furnace atmosphere is carefully controlled to produce a light scale that will flake off easily with the first blow of the hammer. This is accomplished by eight automatic proportioning tangential firing gas burners, located in the top or fixed portion of the furnace, which are designed to permit a slight amount of fuel oil to be introduced into the furnace atmosphere during the heating operation. Heating time ranges from 12 to 36 minutes but



Rockwell Portable Rotary Hearth Forge Furnace

may be easily changed to a longer or shorter cycle.

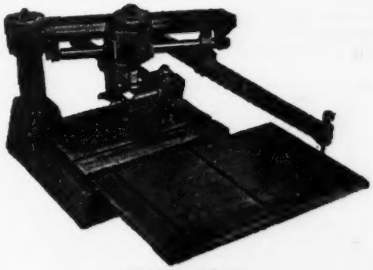
The furnace shell is of fabricated steel plate lined with 4½-inch fire brick plus 4½ inches of insulation. The hearth bottom consists of a 5-inch layer of chrome plastic refractory backed up with 5 inches of refractory insulating brick. The entire furnace, including speed reducer and motor drive, is mounted on a steel base which permits ready portability from place to place. If desired, the furnace can be readily adapted to the annealing and heat treating of small parts by the addition of a door in place of the slot.

Profile Grinder

As an addition to its line of "Master" products, The Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, Ohio, has

Solved!

Your Engraving Problem



MODEL CC 3D

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Model PE-1

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Engraves an area 5 by 5 inches on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics. • Drills a series of holes • Profiles small parts • Increases accuracy and production • Works from original drawing or templates • Etches glass and similar items • Will not cause distortion. For information and prices write Dept. M.

Consult your distributor or

AUTO ENGRAVER CO.

Florida Hill Rd., Ridgefield, Conn.

announced a profile grinder which is claimed to be ideal for the free-hand profile grinding of cams, special machine parts, master templates, and contour gages, as well as the finish grinding of hardened die sections, sectional punches, and trim dies.

The outstanding feature of the machine is the tilting spindle which has an incline range of from 90 to 60 degrees. A precision protractor, read by means of a dustproof lighted periscope from the top of the table, permits settings to within one-quarter of 1 degree. The large cast iron alloy heat-treated table, which measures 24 x 25 inches, is of heavy box-type construction and accurately ground. Table extensions can be obtained for use when grinding large templates.

"Master" Profile Grinder

The spindle assembly is designed to accommodate grinding wheels from 1½ to 5 inches in diameter x 4 inches above the table and offers a choice of two speeds (3,000 and 6,000 r.p.m.) so that maximum efficiency may be obtained from the small as well as the large grinding wheels. The spindle can be of the oscillating or non-oscillating type, as required. A diamond wheel dresser is available which permits the accurate dressing of grinding wheels with tapers up to 30 degrees.

The cabinet of the grinder is of welded construction, totally enclosed, and is

FLYNN OFFSET BORING HEADS

Micrometer offset screw ground from solid.

Large, easy to read dial graduated in .001"

Tool block hardened, ground and fitted to body.

"V" tool block holds any size bar rigid.

Interchangeable shanks and arbors.

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Head No.	Body Dia.	Maximum Bar Capacity	Micro Offset	Price
6	1⅞"	⅜"	¼"	$ 22.
8	3⅛"	⅝"	½"	30.
10	4"	⅝"	½"	70.
12	4"	⅝"	1"	45.
20	7½"	1½"	1"	125.
30	4"	⅝"	1¼"	70.
32	5⅛"	1"	2"	115.
35	4⅝"	⅝"	1½"	85.
36	6⅝"	1¼"	2"	150.

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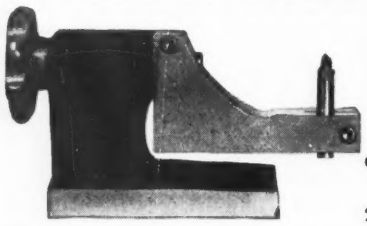

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10" Wheel size for DoALL and NORTON Grinders—$35.00 Less Diamond.

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equipped with a 4-inch dustpipe outlet for attaching to a dust collector. The motor and operating mechanism are designed for heavy duty work, have force feed lubrication, and are oil sealed.

Dual Purpose Cutting Oil

The Standard Oil Co. (Ohio), 1706 Midland Bldg., Cleveland 15, Ohio, is now marketing a dual purpose cutting oil, known as "Sulkleer 177-X," which, it is claimed, can be safely used as the machine lubricant and has the high film strength and anti-weld efficiency necessary in cutting lubrication. The product is a sulfurized oil in which the sulfur is non-reactive to copper and copper alloy bearings at bearing operating temperatures but which does become "active" and perform its function of preventing chip-welding at cutting edge temperatures.

It is stated that the use of Sulkleer 177-X enables maintenance at top efficiency of the cutting fluid when it is also used as the machine lubricant in the gear cases of multi-spindle automatic screw machines. Moreover, the use of the oil as both the machine lubricant and the cutting fluid is said to permit the reclaiming of the oil from chips and its subsequent return in entirety to the gear case and bearing applications, as well as the cutting oil sump for reuse in a continuous cycle.

Twin-Wheel Tool Grinder

The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, has announced a twin-wheel wet or dry tool grinder for carbide, Stellite, and high speed steel tools. Designed for operator comfort, visibility, and convenience, the machine includes degree-graduated independent tilting tables with supports that are integral with the splash pan and base. Table tops have renewable steel wear plates. Convenient handles are provided for tilting the tables 15 degrees above to 30 degrees below horizontal, and

EASY TO USE

For Quick Adjustments

NO FUMBLING—just pull the right length of stock out of package slot and snip it off. The rest of your material is still protected, needs no rewrapping.

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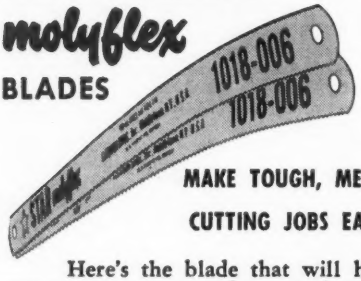
NEW STAR molyflex BLADES



MAKE TOUGH, METAL CUTTING JOBS EASY!

Here's the blade that will help you cut costs . . . speed up tough metal cutting jobs. These new "Molyflex" High Speed Hand Hack Saw Blades combine the ability to cut the hardest materials with a toughness and resistance to breakage that is unsurpassed. They're shatter-proof too!

In recent tests, when pitted against eight leading competitive blades in cutting SAE 52100 ball bearing steel . . . STAR'S new "Molyflex" AVERAGED 23.8% MORE METAL CUT than all the leading brands tested!

STAR STEELRITE METAL MARKING CRAYONS

Ask your STAR distributor about these new and improved metal marking crayons. Available in a variety of sizes, these crayons, made of genuine soapstone by special extrusion process, are uniform in strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

Get your free copy of STAR'S "Metal Cutting" Booklet and the STAR Wall Chart for your shop! Both are packed full of useful information and will help you get maximum results from hand, band and power hack saw blades.

CLEMSON BROS. INC.
MIDDLETOWN, NEW YORK
Manufacturers of Hand and Power Hack Saw Blades and Frames, Metal Cutting Band Saw Blades and Clemson Lawn Machines.

each table has a safety lip to prevent tools from dropping into the recess in the grinding wheel.

Hinged structural steel wheel guards are said to facilitate the mounting of new wheels. Each guard incorporates a single three-way coolant control valve and two spouts. The grinding spindles and coolant pump are V-belt motor driven and fully enclosed. Each grinding spindle is mounted in three precision ball bearings. Quick-acting latches on the large louvered front cover of the machine allow

"Standard" Twin-Wheel Wet or Dry Tool Grinder

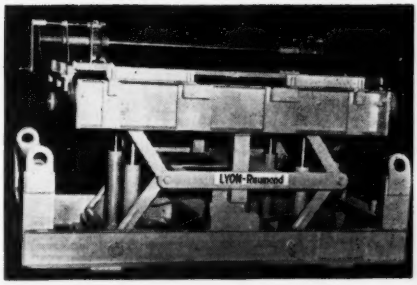
for easy access to the motor, V-belt drive, pump, coolant reservoir, settling chamber, and drain. V-belts are instantly renewable without any dismantling. Crank handles at the top of the grinder provide for independent wheel adjustment.

The machine is available in two types; namely, Type 10TD with 1½ h.p. motor for two 10-inch plate mounted cup wheels and Type 14TD with 3 h.p. motor for two 14-inch plate mounted cup wheels. Standard equipment of the machine includes a reversing control switch; two removable covers for access to all parts and equipment; protractor tool guide with diamond holder; resilient tray for tools and honing stone; and built-in exhaust outlets for dry grinding.

Die Handling Truck

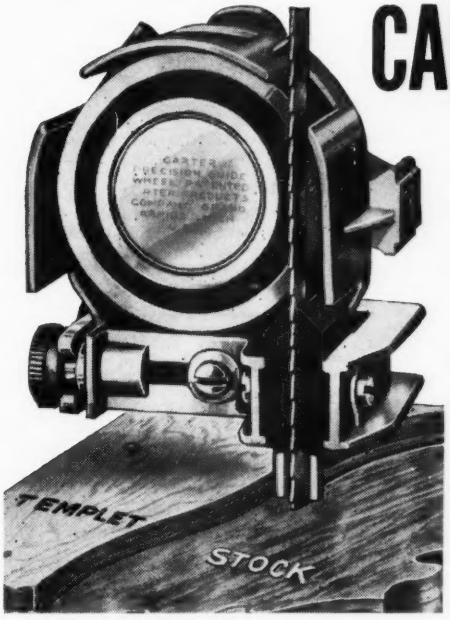
A heavy duty hydraulic die handling truck announced by the Lyon-Raymond Corp., 3951 Madison St., Greene, N. Y., features a capacity of 20,000 lb., four hydraulic lifting cylinders, motor-driven hydraulic pump, provision for inserting and removing die slings, hand winch, retractable wheels, and roller top with three removable retaining bars for safety. A range of elevation from 28 to 44 inches allows the table to be used with presses of various heights. Four synchronized hydraulic hoists raise and lower the platform by means of push-button controls operating solenoid valves in the power-driven pump.

Dies are transported to and from storage by means of an overhead crane. A unique arrangement is incorporated in the table for inserting or removing the cable slings. When the die is placed on the table, the platform is in the lowered position. Six vertical posts extend up between the rollers two inches to support the die and allow the slings to be removed. When the table is elevated, the six posts are relieved of the weight of the die which is then free to move on the rollers.



Lyon-Raymond Heavy Duty Hydraulic Die Handling Truck

A winch arrangement is used to draw dies from presses to the table and, by means of an arrangement of sheaves, also transfers dies from the table to the press. The winch has a 96 to 1 ratio, thus enabling it to handle extremely heavy dies. Retractable wheels permit the empty table to be moved into position; however, when loaded, the table rests on base supports for proper stability. Four



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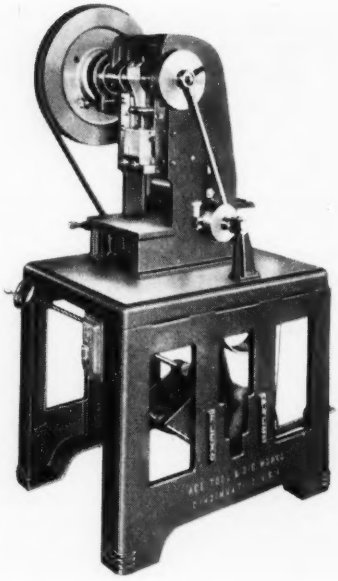
Grand Rapids 2, Michigan

sling rings allow the table to be readily handled by means of overhead crane equipment.

Automatic Press

For the high speed production of small parts, the Ace Tool & Die Works, 129 E. McMicken Ave., Cincinnati 10, Ohio, is offering the Model 600 Standard "Flex-O-Press" shown herewith, which has a rating of 12 tons and is designed to handle material up to 9 inches wide. The length of feed per stroke is variable from 0 to 12 inches.



Model 600 Standard "Flex-O-Press"

The press has a frame of welded steel construction and weighs 1,400 lb. Additional specifications are as follows: diameter of crankshaft at bearings, 1⅞ inches; diameter of crankshaft at connection with ram, 2 inches; bed area (front to back and right to left), 9⅜ x 11 inches; opening in press frame and table, 9 inches (front to back) and 8⅛ inches (right to left); center of ram to front gage, 4½ inches; distance from bolster to top of lower feed roll, 2½ inches; diam-

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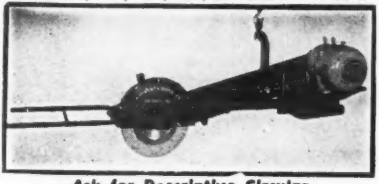

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eter of feed rolls, 3½ inches; shut height (bolster to ram, stroke down, adjustment up with standard stroke), 6 inches; bolster plate thickness, 1 inch; stroke of ram, 1½ inches; hole in ram for punch shank, 1⅝ inches in diameter x 2⅛ inches; distance between gibs, 6⅝ inches; face of ram (front to back), 5 inches; adjustment of ram, 1½ inches; floor space of legs (front to back and left to right) 26½ and 36½ inches; overall floor space required (left to right and front to back), 30½ and 36½ inches; height overall, 67 inches; diameter and face of flywheel, 21 and 3 inches; weight of flywheel, 200 lb., speed (strokes per minute infinitely variable), 150 to 600 r.p.m.; motor, 1½ h.p. 1,725 r.p.m. unit for operation on 220-440 volts, 60-cycle current.

Toolmaker's Lathe

Designated as the Model 8A, a precision toolmaker's lathe with 1-inch collet capacity and 8½-inch swing and embodying stepless spindle speeds from 32 to 2,000 r.p.m. has been announced by The Wade Tool Co., Waltham 54, Mass. With the back gears engaged, the stepless spindle speeds range from 32 to 220 revolutions per minute.

The variable speed drive includes an electric tachometer, located on the face of the headstock housing, which registers all spindle speeds. Entirely mechanical and designed to permit spindle speed changes while operating, the drive features a unique clutch which enables the operator to start, stop, and brake the spindle while the motor is running. Powered by a 1 h.p. motor, with all controls protected in an enclosed panel, the lathe affords ample torque for low spindle speeds due to the back gear ratio of 9 to 1. High spindle speeds are provided for by matched V-belts on the open drive. All countershaft bearings of the variable speed drive are of the ball type, permanently sealed with lubricant.

The bed of the Model 8A is made of close-grained alloy cast iron in the shape

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No thread damage. Set screw does not touch threads.
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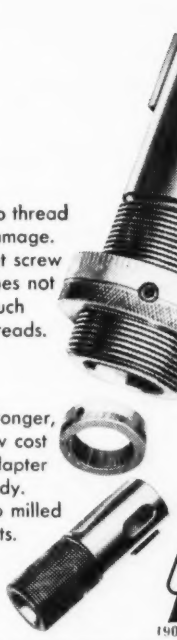
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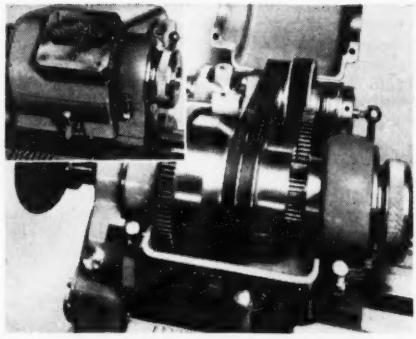
of a hollow square, ribbed to provide for maximum strength and rigidity. The front way of the bed is of extra heavy design and is located directly over the supporting side of the bed. The rear guideway serves in an auxiliary capacity; however, since both ways are very broad, it is claimed that the lathe can take unusually heavy cuts and produce fine finishes without chatter. The bed is available with ways either hardened and ground or hand scraped and spotted.

Another feature of the lathe is the case hardened steel tool block mounted on the rear station of the compound cross slide.



Close-Up View of Headstock of Wade Model 8A Toolmaker's Lathe

The block, which has a range of longitudinal adjustments, is designed to accommodate cutoff or form tools.

D.C. Arc Welder

Developed by the Hobart Bros. Co., Box 489, Troy, Ohio, the "Bantam Champ" Model MZ-200-S D.C. Arc Welder shown herewith is rated 200 amperes at 30 volts on 50 per cent duty cycle. The current range is from 40 to 250 amperes at an operating speed of 3,450 revolutions per minute.

The welder is 26¼ inches long x 18 inches wide x 25 inches high and weighs approximately 340 lb. The generator is a modified multi-range type with four laminated main poles and four interpoles which are removable. The four heavy duty generator brushes are held in a fixed neutral position by a single unit brush rigging.

The welding controls of the unit are of

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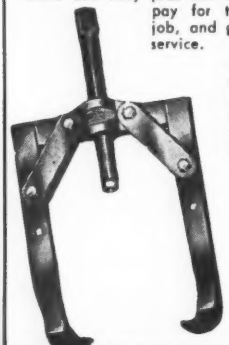
These powerful service tools Pull gears, wheels, bearings and bushings from shafts, easily and quickly. They eliminate pounding, battering and breakage of vital machine parts. They make tedious and risky jobs fast and safe. They usually pay for themselves in the first job, and give years of satisfying service.



12 types, 40 sizes (including special designs for special application) with Drop forged arms and heat treated forcing screws.

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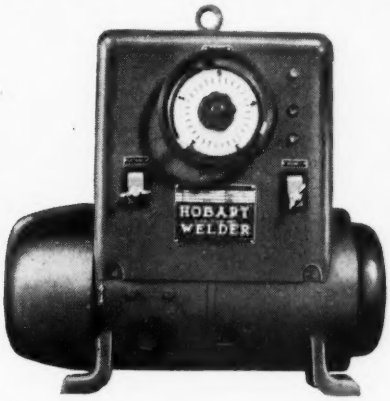
the modified multi-range dual type which provides five ranges of welding current and 100 steps of volt-ampere adjustment



Hobart "Bantam Champ" Model MZ-200-S D.C. Arc Welder

in each range, thus making available 500 combinations of open circuit voltage and welding current for selecting any desired arc characteristics. The main switch is of heavy copper molded in Bakelite and is controlled by a large hard rubber covered handwheel. The volt-ampere adjuster is compactly built behind the main switch.

The welder is powered by a squirrel cage induction type electric motor having rotor bars which are welded to form a solid copper squirrel cage. The stator is ground concentric with the bearings to ensure a uniform air gap. Voltage change-over terminals are provided on the starting switch. Motor leads are brought out to the terminals on the starting switch and can be reconnected to change from 220 to 440-volt power supply and vice versa.

Attachment for Five-Spindle Automatics

Developed by the Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 15, Ohio, an independent attachment designed for installation on Warner & Swasey five-spindle automatics provides for drilling, reaming, facing, chamfering, counterboring, burring, and threading at the fifth longitudinal station, normally inactive during cutoff. The attachment consists of a cam-operated actuating lever which

Extra
PRECISION IN SPINDLE ALIGNMENT

It is not difficult to get that extra precision which many jobs require in aligning the work with the spindle, if you use a Ziegler Tool Holder. Nor is it necessary to take a great deal of time, as with ordinary tool holders.

This is because the Ziegler automatically compensates for inaccuracies in the alignment of the work with the spindle. All that is required is to come within 1/32" of accuracy on the radius, or within 1/16" of accuracy on the diameter and the Ziegler Holder does the rest.

The Ziegler will save you time in making any and all set-ups for tapping and reaming, thus paying for itself in a remarkably short time. Try it on your next job and see for yourself.

Types to fit any machine used for tapping or reaming

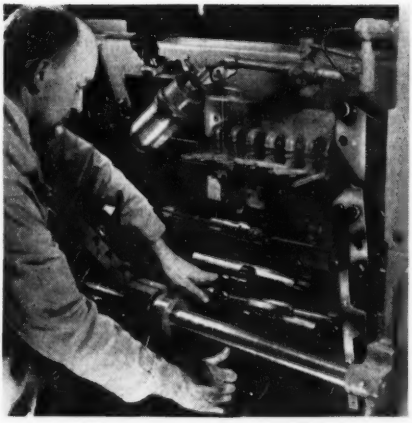
Ziegler ROLLER DRIVE FLOATING HOLDER for Taps and Reamers...

W. M. ZIEGLER TOOL CO.
13570 AUBURN
DETROIT 23, MICH.

WRITE FOR CATALOG

drives a stroke arm linked to a toolholder mounted on a slide which is affixed to the main toolslide. This simple arrangement is said to permit a variable stroke tool with accelerated tool retraction to operate during cutoff, retracting before the finished piece actually drops.

The attachment is provided with easily-set pivot adjustment for an infinitely adjustable feed stroke in a $\frac{3}{16}$ to $3\frac{3}{4}$-inch range within a total stroke of from $3\frac{3}{16}$ to $8\frac{1}{4}$ inches. At both the top link and center pivot points of the actuating lever, a choice of two pin locations in available. Various combinations of these pin locations may be selected, while the stroke arm slide link may be set anywhere along a 4-inch graduated scale at the bottom of the actuating lever for the exact length of stroke desired.



Warner & Swasey Five-Spindle Automatic Equipped with Fifth-Position Attachment

Quick Shipment on

TAPER ATTACHMENTS

For All Lathes Old or New—
9" to 24" swing
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$29.50 to $125.00

MASTER-TAPER COMPANY
4531 N. Beacon Street
Chicago 40, Illinois
Exclusive Mfrs. of Taper Attachments

STERLING DRILL GRINDER

CAPACITY:
3/8" to 2½" drills.
5" x 9" adjustable table

MOTOR: ½ hp, 3450 rpm.

NET WT: 250 lbs.

CRATED: 320 lbs.

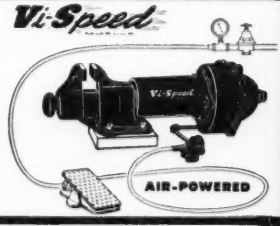
McDONOUGH MANUFACTURING CO.
EAU CLAIRE, WISCONSIN, U. S. A.

Automatic Broach Handling Equipment for Presses

Described as particularly suitable for "hard gear" broaching, and so on, automatic broach handling equipment is now available on the complete line of standard presses ranging from 4-ton 24-inch stroke to 10-ton 36-inch stroke now being manufactured by the Colonial Broach Co., Box 37 Harper Station, Detroit 13, Michigan.

A typical application of the equipment

Vi-Speed



AIR-POWERED

FAST
RUGGED
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HOLDING
PRESSING
PUNCHING
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SIMPLE
DESIGN
•
5 MODELS
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Guaranteed
•
WRITE FOR
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VAN PRODUCTS CO.
1304 G. D. BALDWIN BLDG.
ERIE, PENNA.

on a Colonial utility press is shown in the accompanying illustration. The job of this press is the finishing of case-hardened gear splines. The machine is a standard 6-ton 36-inch stroke unit. The broach handling mechanism consists of an automatic release type puller (A) and a lower receiver (B). In the view at the left, the broach is at the top of the stroke, ready to start the cut. As the broach is pushed through the gear, its pilot contacts the broach receiver, forcing it down against a slight hydraulic pressure. At

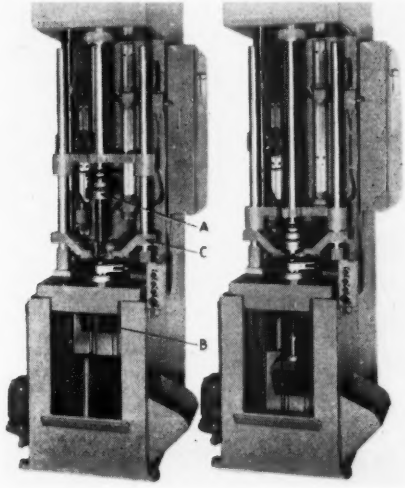


Illustration Showing Operation of Automatic Broach Handling Equipment Installed on Colonial Utility Press

the finish of the stroke (righthand view), two trip dogs (C) cause the broach puller (A) to release the broach, and the receiver lowers the broach clear of the work.

After the finished part is unloaded, hydraulic pressure raises the broach receiver and broach and thus automatically reinserts the broach into the puller. The machine now returns to the starting position, ready for broaching the next gear. Note that a swinging fixture is also used here. Fixture operation is interlocked with the machine cycle. A separate control is provided to permit independent operation of the lower broach handling mechanism for setup.

For both standard and specials, fast, efficient service is constantly maintained to make sure that you get the Right Tap at the Right Time. Try it.

Do the taps you are using today cut costs as well as materials? They should! Tap efficiency, economy and long life can come only by a combination of skilled engineering, experienced workmanship and up to date equipment. All three contribute to the success of Wood & Spencer taps. The hundreds of shop men who buy and use Wood & Spencer taps week after week is convincing evidence.

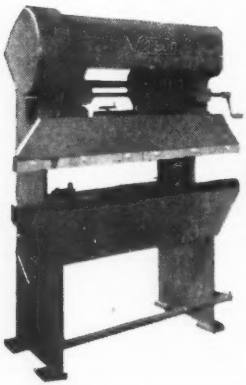
The Wood & Spencer Company
Cleveland 3, Ohio

Process for Casting Salvage

Designated as the "Dot-Weld," a process for reclaiming defective castings and repairing cracked castings and motor blocks has been announced by the Metallizing Company of America, 3520 W. Carroll Ave., Chicago 7, Ill. Said to provide for the application of metal to a finished casting without warping or distorting the parent metal, burning or oxidizing the metals deposited or the parent metal, the process may be used for the salvage of defective castings having small pinholes, voids, and shrinks; for applying metals to mismachined surfaces; for the repair of cracked motor blocks, heads, and castings; for press-fit applications; for adding metal to patterns; and for the preparation of hardened surfaces as a bond for sprayed metal.

For a Dot-Welding and casting salvage installation, the equipment required includes a 220-volt bonder, air filter and regulator, set of rotary files, and ME-1 peening hammer. The equipment required for the installation of a block repair station includes a 220-volt arc bonder, Moguloid pistol, air filter and regulator, mechanical kit, and peening hammer.

BIG PRESS BRAKE DESIGN
SMALL BRAKE COST



Shops that are wasting manpower with hand brakes or tying up big machines with small odd jobs have the answer to their problems in the new Verson 16-48 Press Brake. Compact and low in cost, the 16-48 brings the advantages of power operation and big brake design to smaller shops. Bed and ram length is 48". Capacity ranges from a 48" length of 16 ga. steel to a 24" length of 10 ga. steel. Allsteel construction assures perfect alignment and maximum rigidity. Write for a copy of Bulletin 16-48A; it gives complete design details, specifications and capacities.

VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Ave. CHICAGO 19, ILLINOIS

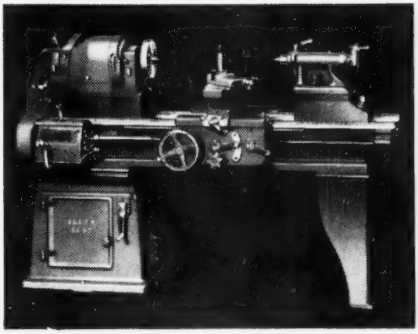
Holmes St. and Ledbetter Dr. DALLAS 8, TEXAS

THERE'S A VERSON PRESS BRAKE FOR EVERY JOB FROM 15 TONS UP!

Quick-Change Gear Lathe

Designed especially for machining large diameter work that is not excessively heavy, a 24-inch swing quick-change gear lathe having 16 spindle speeds from 11 to 727 r.p.m. has been placed on the market by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind. The maximum swing over the carriage is 24¼ inches; over the saddle cross slide with chip guard, 18¾ inches; and over the cross slide without chip guard, 19¼ inches. The distance between centers varies from 30 to 102 inches, depending upon the length of the bed. Power longitudinal feeds range from 0.0015 to 0.0841 inch; cross-feeds from 0.0006 to 0.0312 inch. The quick-change gear mechanism provides for 48 pitches of screw threads ranging from 4 to 224 per inch, right or left hand.

The large ca-



South Bend 16/24-Inch Swing Quick-Change Gear Lathe

pacity of the lathe is said to make it particularly useful in boring jig plates, turning and boring wheels, machining pulleys, brake drums, and mounted in the cabinet leg underneath the headstock for driving the lathe. Power is transmitted by a belt to the headstock cone pulley. The use of a direct belt drive to the spindle is said to eliminate the possibility of gear vibration at high speeds. Low speeds are effected through back gears. A six-station motor control provides for push-button selection of high and low speeds in both forward and reverse.

Motor Generator Sets

The Kato Engineering Co., 1415 First Ave., Mankato, Minn., has announced a series of motor generator sets under the trade name of "Katolight," designed for changing d.c. to a.c., a.c. to d.c., or from one frequency to another frequency. A direct coupling drive is utilized where speeds can be the same. When changing from one frequency to another, it is usually necessary to use a V-belt drive. In these cases, an adjustable V-belt pulley is installed on the motor, thus permitting adjustment of generator speed and frequency to any predetermined condition of load.

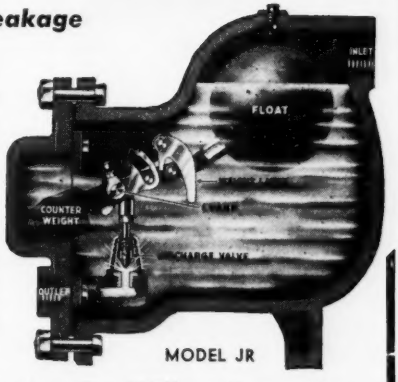
Variable pitch pulleys are also available that permit the adjustment of speed with the motor and generator running. A special slide base is then furnished and the central distance between shaft centers is varied by a handwheel. The variable pitch pulley automatically increases and decreases pitch diameter. Moreover, the

Nicholson Air Traps

STOP BLOW-THROUGH

Two Features Prevent Leakage

The discharge valve of Nicholson weight-operated air traps is unaffected by dirt and scale because of the large orifice and the nature of the operating mechanism. Thus tight closure and prevention of blow-through is assured. A positive water-seal at valve is another Nicholson leak-proofing feature. Three types, press. to 1500 lbs., for aftercoolers, separators, etc. For details, CATALOG 448.



MODEL JR

W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

Steam & Air Traps . Control Valves . Expan. Mandrels . Arbor Presses . Welded Floats

ARTUS PLASTIC SHIM

AND FEELER GAUGE STOCK

The COLOR tells the THICKNESS

Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together. $4.25.

Order today. ***Immediate delivery.***

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SOME Finish!

COLONIAL BUSHINGS INC.
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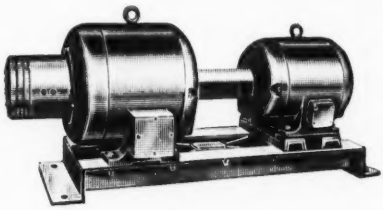
DETROIT 13, MICHIGAN

company has available induction motors which run at synchronous speed so that there is no change between partial load



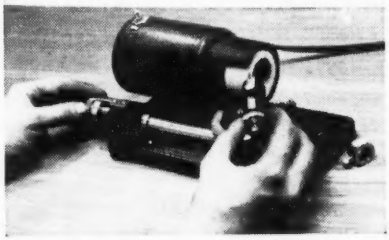
"Katolight" Motor Generator Set

and full load. A silent chain or timing belt is used to transmit power from the motor to the generator.

Katolight Motor Generator Sets are furnished in sizes up to 300 kw., from 15 to 400 cycles.

Engraving Cutter Grinder

A bench grinder which is designed to enable small engraving cutters to be accurately sharpened by unskilled workers has been placed on the market by the Green Instrument Co., 385 Putnam Ave., Cambridge, Mass. Occupying a bench space of 6 x 12 inches, the grinder can be readily placed in a position convenient to machines where cutters are in use. The standard cutter head is designed to ac-



Green Engraving Cutter Grinder

commodate Green tapered shank engraver cutters but can be supplied in other tapers with collets for handling straight shank cutters. The hand-operated in-feed is graduated in thousandths of an inch.

The grinder is equipped with an a.c.-

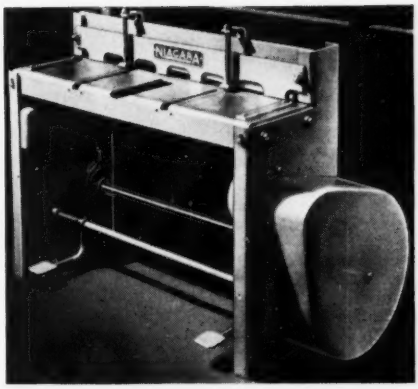
d.c. preloaded ball bearing motor providing 1/10 h.p. The motor shaft is exposed at both ends so that a buffing wheel may be attached without disturbing the grinding wheel. Moving parts and slides are accurately machined. Other parts are provided with a heavy duty black crinkle finish. A unique clearance collar permits accurate positioning of quarter round tools.

The grinder is furnished complete with a diamond dresser, clearance collar, and Norton wheel.

Light Power Shear

A high speed power shear for light gauge sheet metal has been introduced by the Niagara Machine & Tool Works, Buffalo 11, N. Y. According to the manufacturer, the shear is designed to operate continuously at 125 strokes per minute on mild steel up to 20 gauge in thickness, producing cuts that are straight and clean. Full visibility of the cutting edge through the arched opening and over the top of the hold-down bar of the unit is said to facilitate shearing to accurate layout lines.

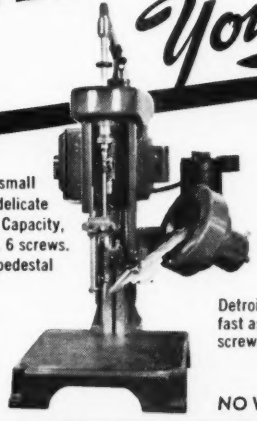
The housings, bed, hold-down, and crosshead of the machine are fabricated from electrically welded steel plate to provide for maximum strength and rigidity, as well as minimum weight for portability. Carefully fitted bronze bearings and ways are said to assure long life and dependable service. The axial air gap or



Niagara Light Power Shear

TELL US *Your Problems*

SEND SAMPLES FOR FREE ESTIMATES NOW!



MODEL A
For driving small screws in delicate assemblies. Capacity, No. 2 to No. 6 screws. Bench and pedestal types.

ALSO 2 OTHER MODELS

We have a
DETROIT POWER SCREWDRIVER
to Fit Your Needs

Let us show you how this modern machine will greatly speed your assembly work, raise production and cut costs . . . Hopper-fed Detroit Power Screwdrivers will drive all types of screws at amazing speed, as fast as one a second . . . Think what a tremendous time and labor saver! . . . All screws driven to uniform tension . . . No marring of heads or stripping threads.

Let's get started Now for 1950

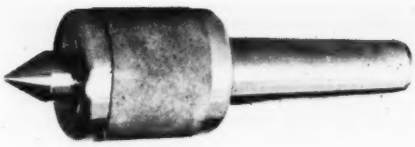
NO WAITING, NO DELAY...Delivery within 10 days on certain models

DETROIT POWER SCREWDRIVER CO.
2807 W. FORT ST.
DETROIT 16, MICH.

"pancake" type motor of the shear is almost entirely concealed in the right-hand upright, thus providing a compact, completely covered motor drive unit.

Ball Bearing Live Center

A ball bearing live center which is said to eliminate burning and regrinding and is designed to provide a heavy load capacity which enables the center to accommodate a thrust load up to 60,000 lb. has been introduced by Montgomery & Co., 53 Park Place, New York 7, N. Y. The point is made of tool steel which is hardened and ground. Concentricity is said to be assured by grinding the shank and point on a patented jig.



Montgomery Ball Bearing Live Center

The center is available in 12 different standard models, 25 different semi-standard models (those for which patterns, jigs, and so on, have already been made), or may be made specially to user specifications.

STURDY, CONVENIENT, LOW-COST

JIFFY ALL METAL CABINETS

FOR SMALL PARTS, DRILLS, TOOLS, CARBIDE TIPS AND MOUNTED POINTS

32 DRAWER UNIT • DIVIDES INTO 96 COMPARTMENTS

$8.95

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64 DRAWER UNIT • DIVIDES INTO 192 COMPARTMENTS

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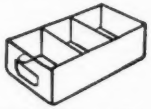
Rustproof Aluminum Drawers



Complete set of Dividers and Index Cards supplied.

APPROXIMATE SIZES
DRAWER 1¼" Deep 2¾" Wide 6" Long
32 DRAWER UNIT 6" Deep 12¾" Wide 15¼" High
64 DRAWER UNIT 6" Deep 25½" Wide 15¼" High

Spot welded steel cabinet, metal flange drawer guides, enamel finish and solid one-piece aluminum drawers in natural satin finish. The first multiple drawer metal cabinet for convenient storage of small parts, drills, tools, carbide tips, mounted points or assembly bench work at such a low cost. Order now for immediate delivery. Send check or money order or rated companies shipped on receipt of purchase order.

KAYTEE PRODUCTS

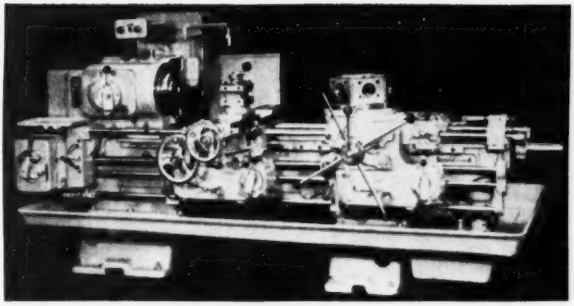
DEPT. 15 - BOX 588 - CANTON, OHIO

Floor Repairing Material

For patching wood or concrete floors or for the complete resurfacing of aisleways, loading platforms, ramps, and so on, The Monroe Co., Inc., Dept. 84-6, 10703 Quebec Ave., Cleveland 6, Ohio, has placed on the market a plastic-type material known as "Swift-Floor." One minute after application, the material is claimed to accommodate a load up to 50,000 lb. without damage.

Designed for easy application by inexperienced workers, Swift-Floor, it is stated, can be installed with either a tamper (supplied with initial order for one drum of material) or by rolling, and, since the ma-

J & L Model 7A Saddle Type Universal Turret Lathe



terial is set by compression rather than water evaporation, the more traffic that flows over it the heavier the load, the smoother and harder the floor is said to become. The material is supplied in 55-gallon lever-top drums, ready to use without mixing.

Universal Turret Lathe

Completely redesigned to provide the optimum in rapid, economical metal removal, the J & L Model 7A Saddle Type Universal Turret Lathe illustrated herewith, product of the Jones & Lamson Machine Co., Springfield, Vt., has a 2½-inch bar and 12-inch chuck capacity. The machine weighs over 4½ tons without tooling.

The design of the bed emphasizes strength and rigidity and provides for increased facility in chip disposal. Threading to maximum turning length with the carriage or saddle is made possible by a full length lead screw. An all-sliding-gear quick-change gearbox with single lever pitch selector provides for a wide range of pitches. Both the cross slide and saddle are equipped with power rapid traverse, and the turret is power indexed. Two ranges of 12 spindle speeds, 20 to 1,000 or 30 to 1,500 r.p.m., are available

Economy's

CLOSE-TOLERANCE DRILL-JIG BUSHINGS AND GAGES MEET YOUR HIGHEST STANDARDS

All A. S. A. standard types and sizes are in stock, ready to fill your order. And if you need new gages or gages salvaged by hard chromium plating, you can also depend on fast delivery. Write for bulletin and price list.

Economy TOOL & MACHINE CO.

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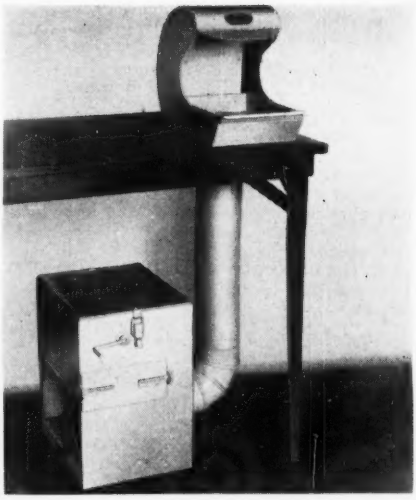
with a constant speed motor. Selection of the desired range is made by a single lever speed selector.

Midget Dust Collector

Identified as the "Dustkop" Model 331D, a midget dust collecting system for laboratory, small-wheel grinding, buffing, polishing, and other operations has been placed on the market by the Aget-Detroit Co., 207 Main St., at Washington St., Ann Arbor, Mich. Rated in excess of 300 c.f.m., the unit is especially designed for installation where space is extremely limited and is supplied complete with a bench-top hood, sheet metal pipe, and elbows for quick and easy installation.



Dustkop Model 331D Dust Collector

Suction is supplied by a paddle-wheel fan, direct driven by a ¼ h.p. continuous duty motor. A special dust separator, together with a non-inflammable spun-glass filter, provides a two-stage means of cleaning the air of its dust before being returned to the working area. A hand crank on the side of the unit allows for a periodic shake-down of the filter, which can be easily and economically renewed when necessary. The collected dust is removed by means of a handy cleanout tray.

The hood provided with the dust col-

A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.

The Heimann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in 3/16" to 1" diameters. *Send for price list.*

HEIMANN MFG. CO.

330 Lincoln Ave. Urbana, Ohio

lector has a socket for a light bulb. Two removable trays, one for wet and the other for dry grinding, are also supplied. The hood, connecting pipe, and dust collector are finished in gray-green enamel, the entire unit being completely fabricated of heavy gauge steel.

Flexible Shaft Couplings

A series of light duty flexible shaft couplings which is said to be particularly useful in the electronics and instrumentation fields has been announced by the Elliott Mfg. Co., 213 Prospect Ave., Binghamton, N. Y. The couplings can be used for knob controls of small valves, gears, pulleys, and so on, and as a driving medium for light transmission systems where the connected shafts are misaligned. The couplings can be obtained with a wide variety of standard fittings having threaded, socketed, slotted, flatted, splined, and plain terminals for diversified uses.

Screw Thread Measuring System

For the measurement of screw threads of various types, O-Vee Spring Gauges, 2429 W. Vernon Ave., Los Angeles 8, Calif., is distributing a gaging system comprising a thread measuring gage, screw thread comparator, and screw thread pitch gage. The thread measuring gage consists of a spring made from wire of the correct size to suit the thread for which it has been designed. Attached to the spring is a data plate giving details of the size, specification, and high and low limits over the wires.

In use, the gage is fitted to the screw, a micrometer reading taken over the tops of the wires, and the reading compared with the limits engraved on the data plate. If the reading lies between the high and low limits, then the effective diameter of the screw is correct.

The screw thread comparator also employs the wire method of screw thread measurement. The measuring elements of

True in 1899...True today..
You Get BETTER MARKING with
Pannier "Master Markers"

Steel Forging Stamps—Hand, Eye & Fullered
Embossing Dies
Stamping Dies
"Supreme" Steel Type & Holders
Roller Dies and Segments
Extra Fillet, Double Bevel Steel Stamps—letter, figure, symbol, name.

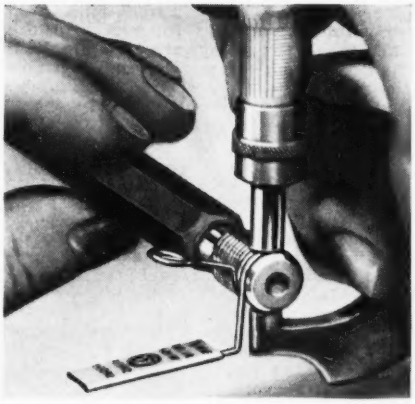
Famous in the steel industry for their durability and "good impressions", these Pannier "Master Markers" are *still* your best bet for efficient and clear-cut marking of steel and steel products. Write for full information today.

Pittsburgh, Pa. Jacksonville, Fla.
Chicago, Ill., Los Angeles, Calif., Youngstown, Ohio, Philadelphia, Pa.

MASTER PANNIER MARKERS
THE PANNIER CORPORATION
202 Pannier Bldg.
Pittsburgh 12, Pa.

the instrument are pairs of helical springs of the correct size wire to suit the thread being measured. Each pair of springs is supplied in a container clearly marked with the pitch of the screw for which it is intended. Two constant dimensions are also engraved on the container, one for Whitworth and one to U. S. threads.

For measuring effective or pitch diameter, the wires used on the comparator are employed in the form of two helical coils which are supported loosely on one fixed and one movable anvil. The convolutions of the coils adapt themselves to the thread of a screw placed between



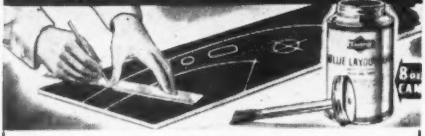
O-Vee Thread Measuring Gage in Use

them and make contact with the thread flanks. Any variation in the pitch diameter of the work from the standard by which the comparator was set is shown by a pointer moving over the scale of the comparator.

The third item in the O-Vee Screw Thread Measuring System, the "Helix" Screw Thread Pitch Gage, is designed to provide a rapid means of ascertaining the pitch or number of threads per inch of screw threads. The gage consists of a plate having formed upon it a number of grooves of screw thread form varying in pitch from 48 to 8 T.P.I., with a scale indicating the equivalent T.P.I. of various points along its length.

To determine the number of threads per inch of a screw thread, the screw is pressed firmly on the grooves at approximately right angles to the right-hand edge and drawn along the gage until the pitch of the grooves coincides with the

BLUE LAYOUT DOPE



Speeds layout on all metals. Drys fast. Oil resistant. Won't chip, crack or flake off. Comes in handy 8 oz. brush-in cans, pts., qts., drums. Order now! SAMPLE FREE!

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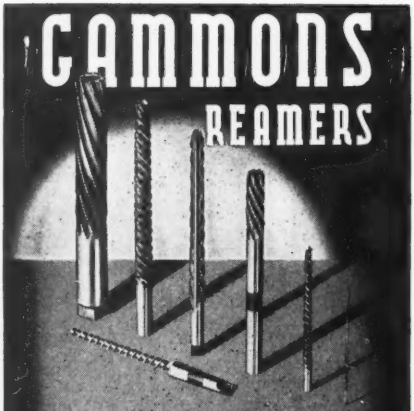

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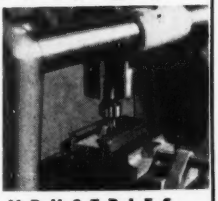
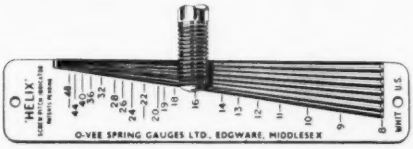
Palmer Milling Attachment quickly converts bench lathe to milling machine. Does the most difficult milling jobs. 8" longitudinal cuts, 3¼" vertical cuts. No chatter. Precision. Sealed for life ball bearings. Complete with vise, $99.50.



PALMER INDUSTRIES
6149 S. Sangamon St., Chicago 21, Ill

pitch of the screw. At this point, the screw will drop into engagement with the thread grooves with a distinct click



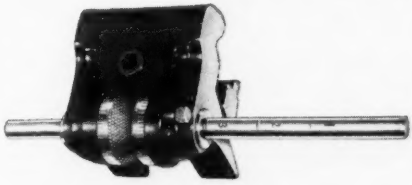
"Helix" Screw Thread Pitch Gage

and the T.P.I. can be read on the scale immediately below the center line of the screw under test.

Lathe Carriage Spacer and Micrometer Stop

Claimed to fit practically every make and size of toolroom lathe without any adjustment, a combination lathe carriage spacer and micrometer stop which can be quickly set for boring holes from 1 to 6 inches deep is being marketed under the trade name of Harper by the Ellwood Products Co., 3049 E. Grand Blvd., Detroit 11, Mich. The attachment can be used in turning diameters, facing shoulders, cutting grooves, and making undercuts accurately spaced to any desired length. All working parts of the unit are hardened for long life and accuracy, with the hardened and ground threads sealed in graphite against dust and chips.

Instantly adjustable from 0 to 6 inches by a simple turn of the spacing bar, the attachment can be used as a stop for cutting threads in blind holes. When necessary, the spacing bar can be moved out of the way without moving the spacer. The micrometer roller is gradu-



Harper Lathe Carriage Spacer and Micrometer Stop

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MULTI-DRILL

Increases Capacity Up to 800%

ADJUSTABLE TO ANY HOLE PATTERN

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If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ⅜" in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for his name, literature and complete details.

COMMANDER MFG. CO.

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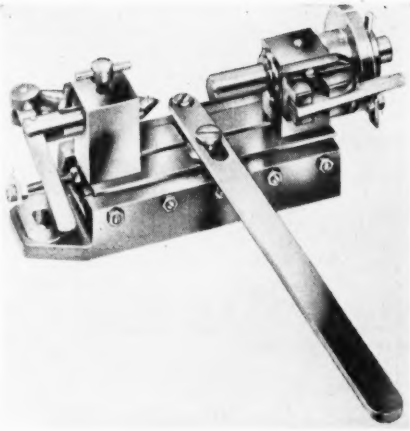
Product of *Commander* — Builder of the *Commander Tapper*

ated on both ends, with the numbers reading in opposite directions to eliminate subtraction in making settings either way.

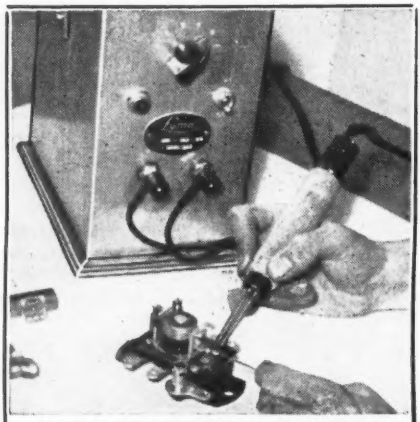
Collet Holding Unit

Developed by H. B. Rouse & Co., 2214 N. Wayne Ave., Chicago 14, Ill., the Rouse No. 9 Collet Holding Unit illustrated herewith is designed for use in performing such operations as spline cutting, cross slotting, small screw slotting, slitting, cutting small pinions, squaring ends of small shafts, squaring at different angles, milling flat spots on small shafts, and so on. The fixture consists of a right-hand collet holding unit with a circular indexing plate in blank which can be easily milled in the user's toolroom for proper slotting or to specifications at the factory. The collet employed is the No. 4 standard type used on Cataract lathes. For holding large type workpieces, an adjustable center unit can be supplied for the fixture if desired.



Rouse No. 9 Collet Holding Unit

The Rouse No. 9 Collet Holding Unit can be used as a jig on machine tools, such as drill presses and lathes, and as a basic part of many other fixtures. It can also be used with a No. 3 unit on milling machines, such as the Rouse hand miller. The No. 3 unit consists of a stationary base plate with either 7¼ or 11-inch sliding table. The sliding table has adjustable stops at both ends with



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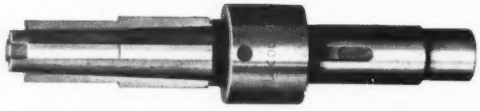

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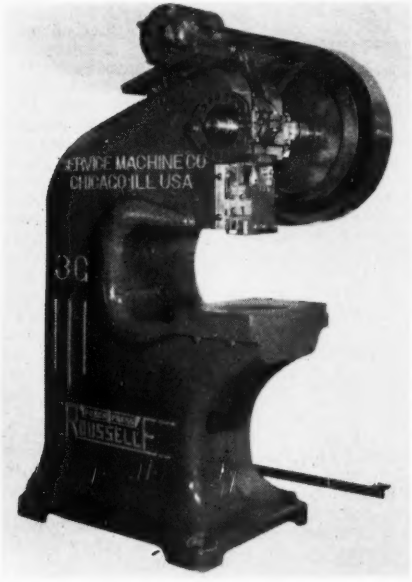
Designed for Accuracy, Strength and Long Service. No fragile parts to wear out. The three blades used in construction correct any inaccuracy of the bore. A set of 5 will take bores from ⅜ inch to 4 inch inclusive. Extra keys can be furnished on No. 5 Mandrel for bores to 7 inches.

SINCE 1847

a movement from left to right of 3½ inches with lever control. The base plate has a $\frac{3}{8}$-inch keyway on the bottom to fit the key in the table of the Rouse hand miller.

Deep Throat Punch Press

Manufactured by the Service Machine Co., 7633 S. Ashland Ave., Chicago 20, Ill., the Rousselle No. 3G 25-Ton Deep Throat



Rousselle No. 3G 25-Ton Deep Throat Press

Press illustrated herewith has an 18-inch throat which permits working to the center of 36-inch sheets, thus making it ideal for fabricating shops. The standard bolster plate measures 14 x 20 inches. Larger bolsters and punch holders can be furnished. The frame is an extra heavy semi-steel casting, heavily reinforced, and is designed so that the bed protrudes, allowing clearance for some jobs that ordinarily would require horn presses.

The No. 3G press is equipped with a single stroke or continuous clutch, roller bearing flywheel, and extra long hardened and ground ways. It is designed to operate at a speed of 125 r.p.m. and weighs approximately 3,200 pounds.

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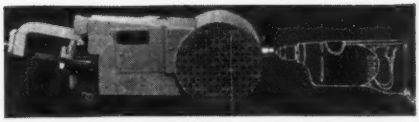
Portable Hack Saw

Said to quickly cut pipe or metals up to 2 inches in diameter, a portable hack saw designed for operation by any standard electric drill is now being manufactured by the Zina Goodell Corp., Salem, Mass. The unit, which weighs 21 lb. (not including drill), utilizes a standard 10-inch hack saw blade and has a 5-inch stroke. The unit has an overall length (not including drill) of 26 inches and operates at a speed of 200 strokes per minute when the speed of the drill is 1,240 revolutions per minute.

All moving parts of the saw are protected by safety guards and are easily accessible by lifting a hood. The unit employs a rotary motion whereby the dust is forced out of the cut and drops to the floor, thus eliminating binding of the blade. Since the blade is held rigidly in position, it is said to cut accurately at all times.



Zina Goodell Portable Hack Saw

For general shop use, the saw can be fastened in a vise on a bench. For cutting overhead pipe and metals in awkward and hard - to - get - at places or for sawing pieces which are too large or too heavy to be taken to the bench, the unit, due to its lightweight, can be easily carried to the job and clamped to the work. The saw is claimed to operate equally well upside down or at an angle.

Box and Pan Brake

A box and pan brake introduced by Berkroy Products, Inc., 2616 N. Ontario St., Burbank, Calif., is designed to bend sheet steel up to 16 gauge and up to 24 inches wide to almost any angle with hairline precision. Folding metal edges for straight seams and hems of many

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May your Holiday Joys be Multiplied!

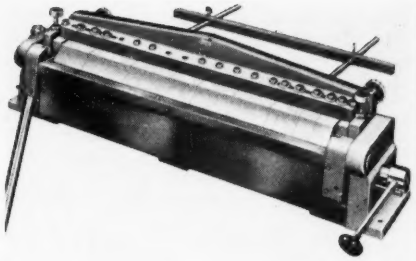
★ With our customers and friends we want to lay aside business cares for the moment and join in spirit to celebrate the joyous Holiday Season.

For you and yours may it be the best ever, full to the brim with deserved happiness and good cheer, and topped with the rich blessings of peace and good will.

To this is added our best wishes for a most Happy and prosperous New Year.

THE WELDON TOOL CO. Cleveland 4, Ohio

3000 WOODHILL ROAD



Berkroy 24-Inch Box and Pan Brake

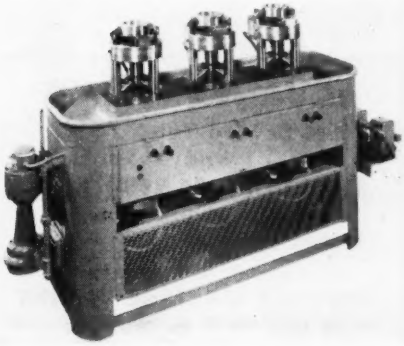
types, metal trim, flanges, tabs, boxes, and pans are typical applications.

Features of the unit include a bending leaf operated with maximum ease on Torrington needle bearings; full 1-inch clearance between top fingers and anvil; full 2½-inch box or pan depth to permit deep bends; and cam-actuated angle stop operated by a knob to provide infinite adjustment to any desired angle from 0 to 135 degrees.

Automatic Tapping Machine

The "Tapmaster" No. 40 Tapping Machine illustrated herewith has been added to the line of automatic tapping equipment manufactured by the D. H. Prutton Machinery & Tool Co., 3731 W. 139th St., Cleveland 11, Ohio. The machine is designed to handle collapsible taps (ranging in size from 1½ to 4 inches) of the type used in tapping gas cylinder

"Tapmaster" No. 40 Automatic Tapping Machine



Save Up To 85% of Weld Cleaning Labor—Unretouched photo shows how quick weld spatter "comes clean" when you paint or spray Protect-O-Metal No. 2 before welding. No profit-wasting work with air chisels, wire brushing, or sand blasting. Get smooth, clean surfaces. Unlike all other "spatter-proofing" compounds, Protect-O-Metal No. 2 will not cause smoke, fumes or odors. One coat serves all needs, costs about 1/10¢ per foot of weld, saves up to three times its cost in time savings alone. Order a Trial Gallon ($3.15) for testing. Your money back if compound does not prove entirely satisfactory.

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caps and large pipe fittings. The taps are actuated by a cam which allows a rise after the tapping operation so that the facing or chamfering of the lower surface of the work can be accomplished with tools attached directly to the tap. In this manner, the facing of the bottom surface is effected during the tapping cycle.

The air fixtures used for holding the work are custom made for each individual job. The fixtures are designed to clamp the work before the tap enters, hold it during the tapping and facing operations, and release it when the job is completed. The time allowance for changing pieces is between 3 and 5 seconds when the machine is operating fully automatic.

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The inherent hardness and durability of granite, accurately finished to a guaranteed tolerance of .00005", provide the most efficient and economical surface plates for precision measurement operations. Sizes up to 8' x 16'.

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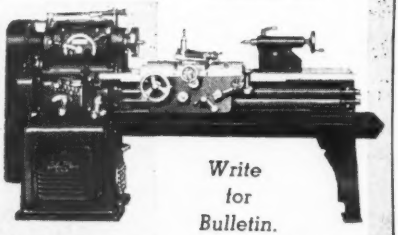

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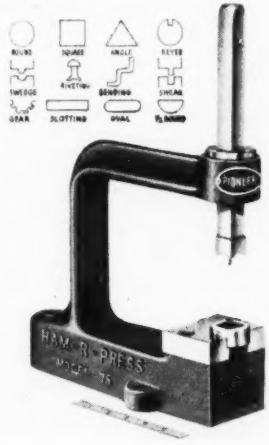
Hand-Operated Press

The Pioneer Broach Co., Dept. KK, 1424 S. Main St., Los Angeles 15, Calif., has placed on the market a hand-operated



Pioneer "Ham-R-Press" Set Up for Punching Square Holes

press for use with mating tools of the punch and die type. Known as the "Ham-R-Press," the machine includes a frame of strong nickel alloy with movable ram precision piloted in the upper frame arm.

In operation, the punch is slipped on a tongue at the bottom of the ram. The die is then placed into an opening in the work

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MILLING MACHINES

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For use on all machines with T-slots.

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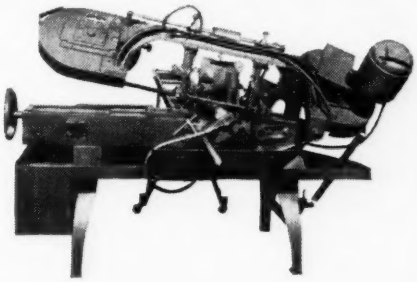
table and locked by a set screw. Material to be worked is placed over the die, the ram is lowered to the material, and the top of the ram is then struck with a hammer. The punch drops into a receptacle under the work table after it passes through the metal.

A complete line of punches, dies, and attachments is available for the Pioneer Ham-R-Press, including punches for round holes ranging in size from ⅛ to 1½ inches and squares and ovals from ⅜ to ⅞ inch, as well as slotting, notching, riveting, marking, shearing, and staking tools. The press is offered in four models having throat depths from 5 to 24 inches.

Automatic Bar Feeding Device

An automatic bar stock feeder that is said to convert horizontal metal cutting band saws into fully automatic cutoff machines has been announced by the Wells Mfg. Corp., 808 Tyler St., Three Rivers, Mich. The device, known as the Wells-O-Bar Feed Master, is designed for easy attachment without interference with normal operations of the saw.

Projection of material is various sizes and shapes, accomplished by an air-actuated (60 to 80 pounds pressure) spiral roller drive, together with positive air control of the saw frame during each cut-



Wells-O-Bar Feed Master Installed on Horizontal Metal Cutting Band Saw

ting and resetting cycle, makes the multiple cutting action completely automatic. The maximum length of multiple cuts is 18 inches. Cuts can be made to within 5 inches of the end of the stock, a safety device tripping on the last piece to shut off the feeder. A roller table track sup-

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Socket Set Screws

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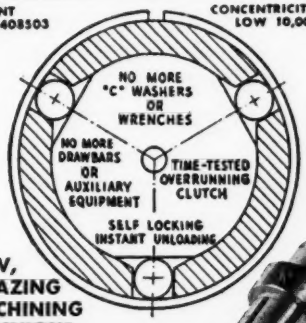
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ports the stock and minimizes friction. The track is adjustable from 24 to 30 inches in height and requires a floor space of 20 x 72 inches. The net weight of the complete unit is approximately 285 pounds.

Roller Conveyor Top for Portable Elevating Table

For use with its "Portelvator," a portable elevating table with four-point support and three table surfaces which is intended for lifting and transporting heavy tools and materials, The Hamilton Tool Co., 828 S. 9th St., Hamilton, Ohio, has announced a roller conveyor top for use in the movement of extra heavy loads to and from the table. The conveyor top is designed to fit snugly over the top table surface and is held in place by a flange which encompasses the table perimeter. The top may be installed or removed as required, without tools, by the simple means of positioning or lifting from position. A wedge placed between rollers at each end of the load is said to prevent the load from slipping during transit.

In addition to the style of top as shown herewith, another style is available with rollers mounted at the ends. Either style can be furnished with a cam-operated roller locking device. The manufacturer is

Hamilton "Portelvator" Equipped with Roller Conveyor Top

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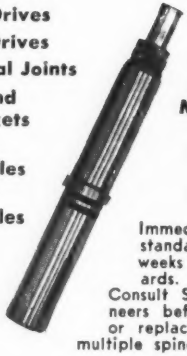

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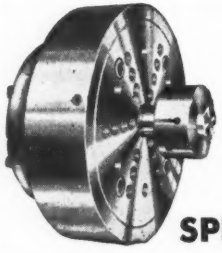

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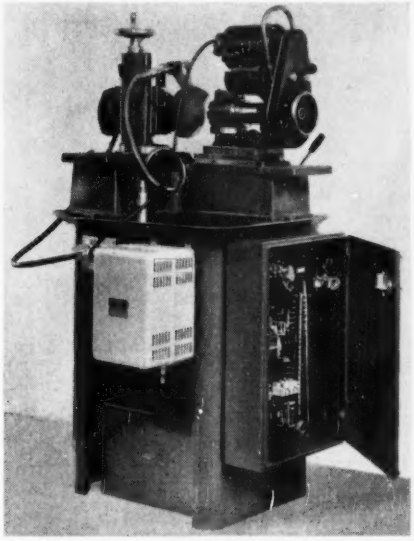
also equipped to design special roller arrangements and additional table features to meet individual requirements.

Motorized Radial Relief Grinder

A powered model of the D-S Radial Relief Tool Grinder, product of the D-S Grinder Division, Royal Oak Tool & Machine Co., 621 E. 4th St., P. O. Box 111, Royal Oak, Mich., is said to adapt this equipment to the economical grinding of production tools in volume. The motor drive employed is a General Electric Thymotrol Unit which provides for stepless speed control through 18 to 150 r.p.m. at the turn of a dial. A complete self-contained coolant system is included.



D-S Motorized Radial Relief Tool Grinder

According to the manufacturer, motorization presents no interference with the regular mechanical operation of the fixture. Cams for tools of 1 to 14 flutes can be readily interchanged, as can collets.

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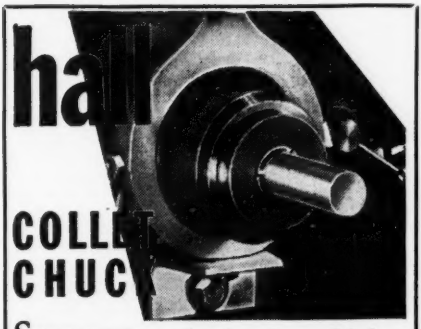
Said to perform equally well on a wide range of work from heavy duty grinding to fine, delicate polishing, an all-purpose



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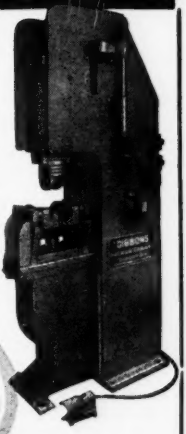

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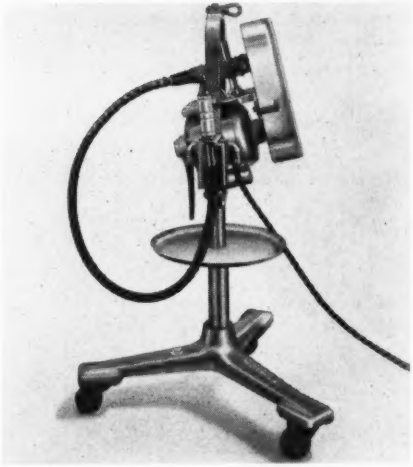
GIBBONS Machine Co.

501 North Fifth Street, Tipp City, Ohio

flexible shaft machine designated as the P&W Series M Kellerflex has been announced by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn. The machine can be mounted on standard floor and bench stands or suspended for convenience. Power to the cable is said to be transmitted without whip. All fittings are standard for P&W attachments and handpieces, which are available in a wide variety of styles, types, and sizes.

The Series M is supplied in two standard speed ranges, one of which includes speeds of 1,000, 2,500, 4,250, and 6,000 r.p.m. and the other speeds of 2,000, 5,000, 8,500, and 12,000 r.p.m. Different speed combinations within each standard speed range may be obtained by shifting the single sheaves of the jackshaft pulleys. Changes are made by loosening two hand clamps for belt shifts and using a standard wrench supplied with the machine for sheave rearrangement.



P&W Series M Kellerflex Flexible Shaft Machine

BRAZING TORCHES

for soldering, brazing

Other useful shop items.

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THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

Boring and Threading Tool Holders

A holder possessing the unique feature of vertical adjustment has been developed by the Bokum Tool Co., 14775 Wildemere Ave., Detroit 21, Mich., to ac-

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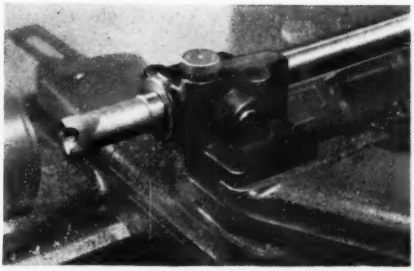
DIVIDING HEADS

Catalog on Request

3 SIZES - 4 MODELS - 6" to 12"
TROYKE MFG. CO.
4422 APPLETON ST. CINCINNATI 9, OHIO



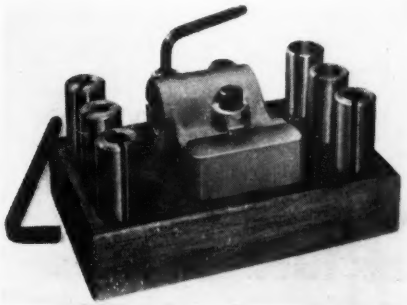
Bokum Boring and Threading Tool Holder with Vertical Adjustment

commodate the large Bokum boring and internal threading tools. The holder has a conveniently located adjusting screw which provides for quick and accurate vertical adjustment of tools. It is bored to accommodate shanks 1½ inches in diameter directly and, with split bushings, will accept tool shanks down to ½ inch in diameter. Smaller tools require a special adapter.

The top of the holder has a finish ground gage pad which facilitates the making of accurate height adjustments. Located exactly 1.375 inches above the center of the bore, this pad provides a reference surface for making both of the adjustments required in setting up helically backed-off boring tools. The pad is also useful in making adjustments for taper boring or threading.

To provide for cases where a boring tool holder is intended to be used only on one lathe and remain on that particular lathe permanently, a holder of fixed height has also been developed by Bokum. The holder has a bored hole of 1½

Bokum Boring Tool Holder with Fixed Height



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No key is needed! Ettco Drill Chucks are *self-tightening*. All you do is insert the drill and turn the body by hand — just enough to hold it. Drilling action does the rest, automatically centering the drill and clamping it in a firm and rigid grip.

What's more, it only takes a twist of the body *by hand* to release the drill.

This keyless feature puts an end to non-productive time spent in looking for lost keys. It saves time in other ways, too, because it permits drills to be changed in a jiffy and eliminates retightening.

Ettco Drill Chucks are available at leading mill supply houses throughout the country. Order a supply today.

BULLETIN NO. 6 — Free

It gives details and prices of these high-quality, precision-made chucks. Write for your copy.

ETTCO TOOL CO.
598 JOHNSON AVE., BROOKLYN 6, N. Y.

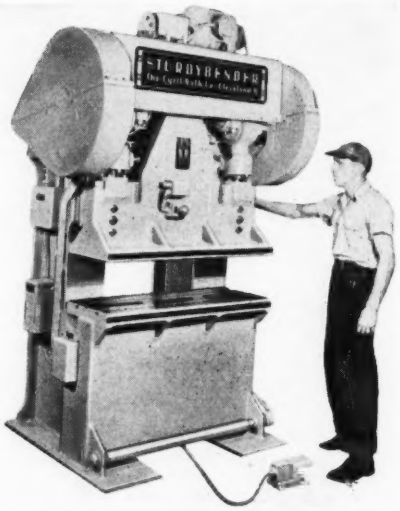
DRILL & TAP CHUCKS • TAPPING ATTACHMENTS
MULTIPLE DRILLING & TAPPING HEADS
DRILLING & TAPPING MACHINES

inches to accommodate large size shanks directly and smaller shanks with the aid of adapters. The holder, which is supplied by the manufacturer to meet the user's height requirements, also has a finish ground pad located exactly on the center height of the bore to facilitate setting of the tool edge to center.

Press Brake

Product of The Cyril Bath Co., 6988 Machinery Ave., Cleveland 3, Ohio, the Sturdybender High Speed Press Brake illustrated herewith is designed to provide up to 80 strokes per minute and features wide bed and ram areas for the mounting of punching and blanking dies. The machine is equipped with a press-control safety mechanism which may be used in continuous operation or arranged to stop at the top of a stroke. Overload protection is also provided. Accidental excessive loads automatically throw out the clutch to prevent damage to the press or dies.

The machine shown is of 35-ton capacity with die area of 15 x 42 inches. Presses of heavier tonnages and with larger die areas are available to meet requirements.



Sturdybender High Speed Press Brake

TYPE HOLDERS AND TYPE . . . ROLL MARKERS . . .
HAND STAMPS . . . LOGOTYPES . . . DIES . . . STANDARD
AND SPECIAL STAMPS . . . INSPECTORS' STAMPS . . .
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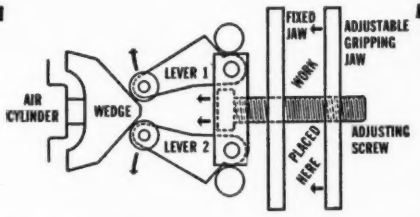
THE COMPLETE LINE—
5 to 200 times air-line pressure.
Write for data sheets.
Patented wedge & lever action shown utilizes total cylinder drive.



production devices, inc. Whitehall, New York

Quick-Lock Nut and Adapter

Scully-Jones & Co., 1909 S. Rockwell St., Chicago 8, Ill., has announced a quick-lock nut and a quick-lock adapter for use separately or in combination with each other. The all-purpose nut is designed to permit quick and accurate adjustment to 0.001 inch and less. A quarter turn of the set screw in the nut instantly wedges its threaded locking shoe against threads without damaging them, it is claimed. The diameter, width, and Acme thread form of the nut are said to conform with A.S.A., G.M.C., and Ford standards.

The quick-lock adapter has a continuous American National Acme thread and includes no slots as in former types, thus making possible infinite adjustment when used with the quick-lock nut. Described as an ideal toolholder for any multiple spindle machine setup, the adapter is said to provide unusual rigidity on such jobs as simultaneous drilling or tapping to varying depths. The quick-lock nut is available in 8 standard sizes of ½, ⅝, ¾, ⅞, 1, 1⅛, 1⅜, and 1⅞ inches. The assembly of quick-lock nut and quick-lock adapter is offered in 11 sizes of ½, ⅝, ¾, ⅞, 1 (No. 1 Morse taper hole), 1 (No. 2 Morse taper hole), 1⅛ (No. 1 Morse taper hole), 1⅛ (No. 2 Morse taper hole), 1⅜ (No. 2 Morse taper hole), 1⅜ (No. 3 Morse taper hole), and 1⅞ inches.

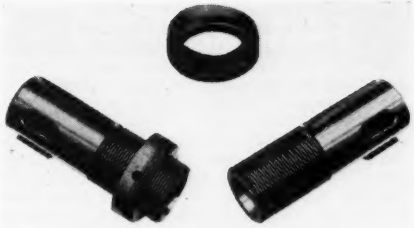


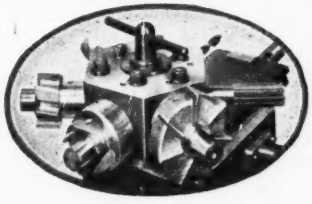
Illustration Showing Scully-Jones Quick-Lock Nut and Quick-Lock Adapter Both Separately and in Combination

Push-Pull-Selector Switch

The Arrow-Hart & Hegeman Electric Co., Industrial Control Div., 103 Hawthorn St., Hartford 6, Conn., has available a push-pull-selector switch which is designed to provide a single master switch control that is said to quickly,

CLOSER TOLERANCES ON YOUR ENGINE LATHE

Turret Tool Posts



Hexturret Bed Turret

Tailstock Turret

HOLD THEM WITH ENCO TURRETS FOR 9" TO 42" LATHES

SPECIFICATIONS OF A FEW OF MANY ENCO TURRET TOOL POSTS

Model No.	HD-2	6-S	4½-R	4½-S	3½-R	3½-S
Suggested Lathe Size	16" to 24"	14" to 20"	15" to 19"	13" to 16"	12" to 15"	10" to 13"
Tool Block Size	6½" sq.	6" sq.	4½" sq.	4½" Sq.	3½" sq.	3½" sq.
Solid Tool Capacity	1½"	1¼"	1"	¾"	⅞"	½"
Price	$138.50	103.50	66.50	53.50	46.00	36.75

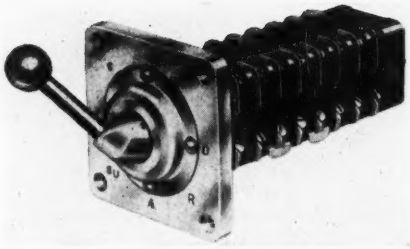
WRITE FOR CATALOGUE No. 48 WHICH SHOWS TYPICAL APPLICATION PHOTOS OF MANY OF ENCO'S 35 MODELS ON ACTUAL JOBS.

ENCO MANUFACTURING CO. Dept. 1129 4524 Fullerton Ave., Chicago 39, Ill.

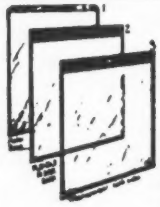
easily, and positively respond to the operator's selection. Eight to 16 positions can be set up on the single dial of the unit. Pulling the handle of the switch in the selected position starts the desired function; pushing the handle stops the action.

In the Arrow-Hart Push-Pull-Selector Switch the push motion on the handle drops out the starters before the load connections can be changed. Turning the handle establishes the desired load connections. Pulling of the handle energizes the starters after the desired load connections are established.

The switch also features rotation without pushing to turn the handle where successive control circuits may be picked up or dropped without shutting down the machine. To establish load contacts before energizing the starters, cams can be cut to delay or speed close or to hold on contact between positions of rotation. Three-wire control, providing under-voltage protection, is said to make the switch completely safe in operation. The cam sections are rated at 30 or 60 amperes per circuit and are built in multiple sections to individual specifications as to control and load circuit combinations.



Arrow-Hart Push-Pull-Selector Switch



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Work Indexing Fixture

Known as the "Precisiondex," a work indexing fixture which is claimed to have a guaranteed indexing accuracy of within 30 seconds of arc has been announced by the Vinco Corp., 9111 Schaefer Highway, Detroit 28, Mich. Adaptable to jig boring and grinding, light milling, surface grinding, drilling, engraving, profiling, light shaping, graduating, slotting, inspection, and other operations, the fixture is sturdily built, and all parts essential to its accuracy are precision ground and lapped.

U TI CA

UTICA TOOLS

For More Tool Mileage

TOOL No. 550—8"
Pistol Grip
Slip Joint
Combination Plier

Designed for pulling cotter pins and other work in close quarters where ordinary pliers are difficult to use... The pistol grip provides greater holding power for pulling or twisting.

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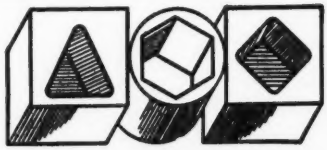
UTICA 4, NEW YORK



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Your business letterhead will bring literature.

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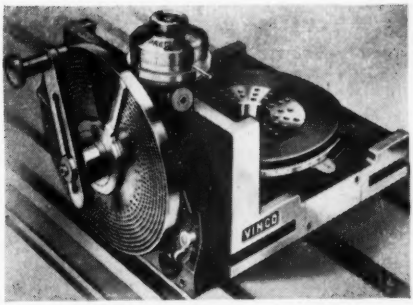


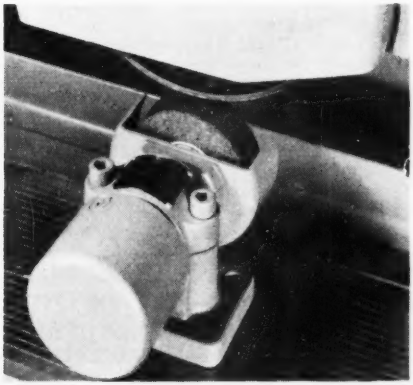
Vinco "Precisiondex" Work Indexing Fixture

According to the manufacturer, the two side surfaces and the bottom surface of the fixture are flat and square within 0.0002 inch, thus permitting work of high accuracy to be performed with the Precisiondex either horizontally or vertically. The micrometer provided on the fixture has a ratchet and pawl arrangement and clear cut markings by which settings in seconds are made. The ratchet and pawl arrangement enables a predetermined number of seconds to be added consecutively to each index.

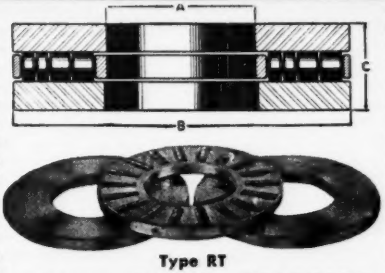
Wheel Truing Device

A device for truing diamond abrasive wheels, to be known as the Norton Brake-Controlled Truing Device, has been

Norton Brake-Controlled Truing Device Set Up For Use



GWILLIAM



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with

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ROTO CENTER

You get these advantages:

- Quality at modest cost.
- Accuracy of + or — .0001".
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- Heavy duty bearings for greater load carrying capacity at cost of ordinary live center.
- Prompt delivery on Special Centers.

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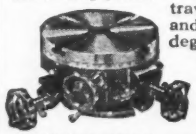
FALLS PRODUCTS, INC.
124 Genoa St. Genoa, Ill.

placed on the market by the Norton Co., Worcester 6, Mass. Described as small and compact, sturdily constructed and extremely simple to set up and operate, the device is a self-contained unit that is driven by the diamond wheel to be trued and is designed for truing diamond wheels of all bond types with the exception of resinoid bonded wheels finer than 220 grit. An outstanding feature claimed for the truing device is the rapidity with which diamond wheels can be trued, including wheels for grinding cemented carbides, cutting and surfacing stone and other hard materials.

DUAL CROSS and ROTARY FEED

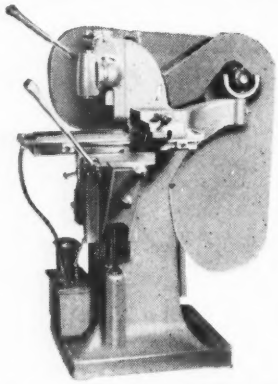
PALMGREN Rotary, Index MILLING TABLE

No. 83 Only $49.50



Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths. Slotted for bolting to table. No. 82 without rotary feed $39.75. *Write for Circular No.* 10.

CHICAGO TOOL and ENGINEERING CO.
8399 South Chicago Ave. Chicago 17, Ill.



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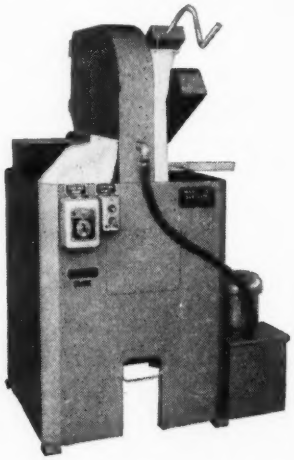
has proved itself the number one value in medium size, all purpose hand milling machines. New universal attachment doubles its scope. Send for information.

The U. S. MACHINE TOOL CO.
A Division of U. S. Burke Machine Tool Co.
22 East 72nd St. Cincinnati 16, Ohio

Abrasive Cutting Machine

The Campbell Machine Division, American Chain & Cable Co., Inc., 931 Connecticut Ave., Bridgeport 2, Conn., has announced an abrasive cutting machine, which is available with a 3 or 5 h.p. motor that may be arranged for either wet or dry cutting.



Campbell Model 15 Abrasive Cutting Machine

Suitable for general purpose work, the machine, which is designated as the Model 15, is said to cut tubes, angles, bar stock, and so on, within its capacity with a minimum of burr by the use of a suitable abrasive wheel. Designed to handle ferrous or non-ferrous material, including corrosion-resisting steels, hardened or annealed steels, the machine may be used to cut light wall tubing of all types up to 1½ inches in diameter and solid bar

KENNAMETAL CUTTING TOOLS

for Increased Productivity

KENNAMETAL *Inc.* LATROBE, PA.

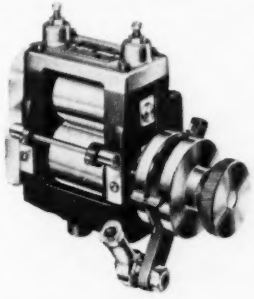
CEMENTED CARBIDE TOOLS, BLANKS, MILLING CUTTERS

stock up to ¾ inch in diameter with a 3 h.p. motor or light wall tubing up to 2 inches in diameter and solid bar stock up to 1 inch in diameter with a 5 h.p. motor.

Roll Feed

Product of the Roll Feeds Corp., Middle St. at Center Ave., Pawtucket, R. I., the "R.F.C." Model AA Roll Feed shown herewith has a length of feed of 1½ inches and width of feed of 2 inches and is said to be suitable for various tonnage bench and pedestal type high speed power presses. The feed can also be obtained in other models with feed length of 1¼ inches and feed width of 1½ inches; feed length of 2¼ inches and feed width of 2½ inches; feed length of 2¼ inches and feed width of 3½ inches; feed length of 6 inches and feed width of 4½ inches; feed length of 10 inches and feed width of 6 inches; feed length of 10 inches and feed width of 8 inches; and feed length of 10 inches and feed width of 10 inches.

Designed for side or rear feeding, the unit is furnished complete with all attachments for installing, including adjusting disc and tie rod. According to the manufacturer, the feed cannot slip at any speed or feed and may be reversed instantly merely by shifting the feed finger



"R.F.C." Model AA Roll Feed

spring from one lug to the other. Constructed to feed in thousandths of an inch, the unit is claimed to maintain its original setting regardless of the use or wear to which it is subjected.

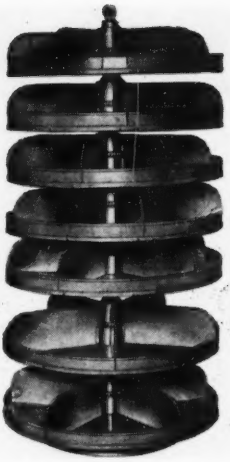
Micro Supreme
LAY-OUT AND IDENTIFICATION DYE
13 COLORS
For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.
MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.

PIONEER
TWO-SPEED ALL PURPOSE DRILL
Gear Shift . . permits change from low to high speed while in operation.
reduces number of drills needed.
operates from 1/4" to 5/8" in steel; 1/4" to 1 1/4" in wood.
combines speed and power in one drill.
A 3/8—5/8 INCH HEAVY DUTY FULL-BALL BEARING DRILL
LOUISVILLE ELECTRIC MANUFACTURING CO.
1000-10 MAGAZINE STREET
LOUISVILLE 11, KENTUCKY

Revolving Bins

For use in shops, maintenance departments, toolrooms, stockrooms, vocational schools, and so on, Lyon Metal Products, Inc., 1038 Monroe Ave., Aurora, Ill., is marketing a line of revolving bins comprising a 7-shelf unit 34 inches in diameter x 65 11/16 inches high, a 4-shelf unit 34 inches in diameter x 37 11/16 inches high, and a counter top 17 inches in diameter x 18 $\frac{3}{8}$ inches high.

Finished in green baked-on enamel, the bins, it is claimed, are complete storage units in themselves, each shelf being arranged to revolve easily in either direction on ball bearing rollers and provided with a continuous label holder. The shelves are stabilized to prevent sagging when unevenly loaded. Up to five additional dividers can be added to separate each shelf into smaller openings. Wide spacing on the two bottom shelves allows for full visibility and quick availability of parts stored therein.



Lyon 7-Shelf Revolving Bin

AUTOM

CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST

1114 E. 87TH ST. CHICAGO 19

Tie-Rodless Air Cylinder

An air cylinder designed without tie rods has been announced by The Tomkins-Johnson Co., Jackson, Mich. Intended for air pressures from 80 to 100 p.s.i., the cylinder is offered in seven different styles up to 8-inch bore and is available with or without adjustable cushions.

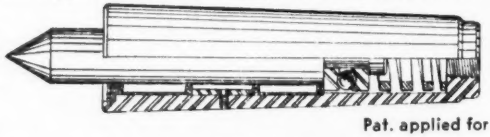
"NIROL" *Needle Bearing Live Center*

Designed for heavy loads and precision work. Minimum overhang of center avoids vibration and chatter. Heavy, powerful spring compensates for any expansion of work due to heating during machining. Compact, neat, and rugged. Maintained accuracy with unsurpassed smooth running performance.

Morse Taper Sizes:

No. 2	$21.75
No. 3	26.75
No. 4	32.50
No. 5	49.75

Other Prices Upon Request.



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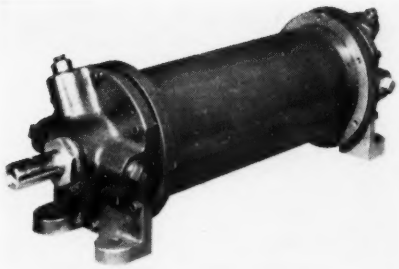
AVAILABLE IN ALL SIZE TAPERS.

L. F. TREICHLER—PRECISION GRINDING 900 Route 29 North Plainfield, N. J.



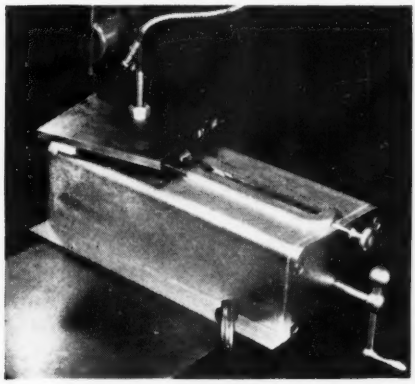
Tomkins-Johnson Tie-Rodless Air Cylinder

Instead of tie rods, round snap rings, seated in grooves in the cylinder body, and steel clamping collars are used. The grooves in the cylinder body are rounded to fit the round spring steel wire snap rings. The clamping collars are designed to hold the snap rings firmly against bottoms of the grooves in the cylinder body, providing maximum support for the cylinder body at these points. Standard heat-treated socket head cap screws, made of high tensile strength steel, are used to attach the clamping collars to the cylinder heads.

Band Saw Fixture

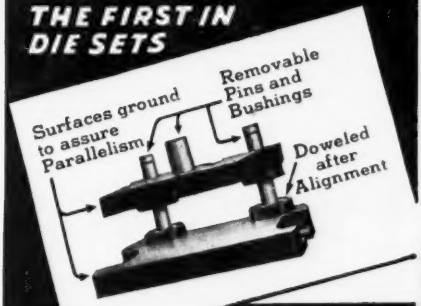
Distributed by E. C. Atkins & Co., 402 S. Illinois St., Indianapolis 9, Ind., the Hamilton Automatic Band Saw Fixture shown herewith is designed to permit a circle from 5 to 18 inches in diameter to

Hamilton Automatic Band Saw Fixture



BAUMBACH

THE FIRST IN DIE SETS



Being originators of Standard Die Sets naturally we are steps ahead in Design — Precision — Dependability and Economy. Baumbach Die Sets can be disassembled. The Leader Pins and Bushings can be used on other size Die Sets — reducing inventorying a lot of Die Sets. Costly machining time is also reduced.

Learn all about Baumbach advantages before you buy. Write for circular.

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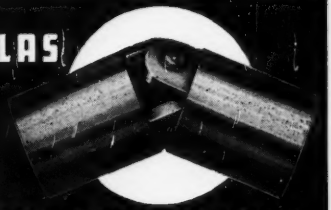
ATLAS



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SAVE WEIGHT - SPACE - COST

Short stubby jaws allow the Atlas to be used in applications where space is limited or where light weight is essential. Bearing loads held to absolute minimum by large bearings OF EQUAL SIZE located at maximum distance from center of joint. For full details write Dept. B.

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Makers of Atlas and Vulcan Universal Joints

THE GRAY & PRIOR MACHINE CO., HARTFORD 5, CONN.

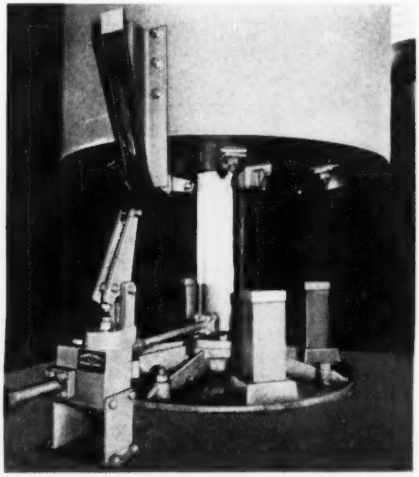
In the West: Link Belt Co., Los Angeles, San Francisco, Portland, Seattle, Oakland, Spokane

be cut in metal up to 2 inches thick. The feed mechanism is driven by a spring motor, which, together with all gears of the fixture, is enclosed for protection from dirt and steel cuttings.

The fixture is arranged to operate for five minutes, automatically stopping when the piece is cut. Designed to permit cuts within $\frac{1}{64}$-inch tolerance, the fixture is said to provide for an even pressure on the saw blade, thus assuring long blade life.

Hydraulic Safety Valve

A high pressure hydraulic throttle-type valve known as the "Protectomatic" has been developed by the R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. Designed to provide a simple and positive means of controlling the falling speed of a weighted-type accumulator, the valve also acts as an automatic protective device in preventing the accumulator tank or platform from crashing on its bumper blocks.



R. D. Wood "Protectomatic" Valve in Use

Ruggedly constructed throughout and designed to operate with a working pressure from 1,500 to 5,000 p.s.i., the valve is provided with a forged steel body, bronze bushings, and stainless steel sliding plunger, seat, and spindle.

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PROMPT DELIVERY
UP TO 12" DIAM. - 3 D. P.
CUTTING ONLY or COMPLETE GEARS
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HUDSON, NEW YORK

Applicator Gun and Lapping Stick for Diamond Compounds

Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill., has developed a pocket-size applicator gun to be used

Engis Applicator Gun and Laminated Lapping Stick for Hyprez Diamond Compounds

with Hyprez diamond compounds for fine grinding, lapping, and finishing jobs. Dustproof, the gun, which holds a 5-gram cartridge, permits the economical application of compound to the work or tool directly from the nozzle, which is designed to extrude exactly metered amounts. Easy to handle, the applicator is particularly intended for use where small quantities of compound are required.

Also developed by the company is a laminated lapping stick designed for fast stock removal with Hyprez diamond compounds. The stick is made of highly compressed wood layers with alternating grain direction and saturated with synthetic resin. The stick is dense, holds its shape and is particularly effective for jobs requiring substantial removal of stock. The stick is 6 inches long and is available in six widths from ⅛ to ¾ inch. The beveled end (45-degree angle) is used for flat work and may be rounded for irregular shapes or pointed for fine detail.

Foot-Operated Air Control Valve

The Hannifin Corp., 1154 S. Kilbourn Ave., Chicago 24, Ill., has added a reciprocating, packless, disc type valve, known as the Model NF'S, to its "Directaire" series of air control valves. Piston operated and pilot controlled, the valve is designed to direct compressed air alternately to two pressure ports for the operation of a double-acting air cylinder. The sliding self-lapping main valve disc is shifted by a reciprocating light metal pis-

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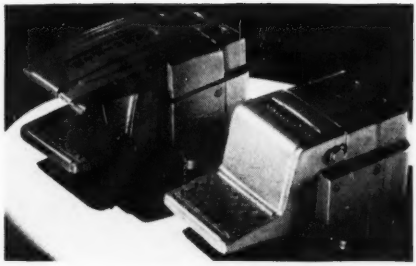
ton, which is moved by alternately admitting line pressure to one end and venting the other.

Although ruggedly constructed to withstand the full weight of the operator, the valve is designed to respond to "tip-toe" touch. The foot pedal actually operates only a small pilot valve and moves less than ¾ inch under very light foot pressure for quick easy action. Air pressure replaces muscular effort in the shifting of the main valve disc. A safety guard, which extends over the pedal to minimize the possibility of unintentional operation, is optional.



Hannifin Model NFS "Directaire" Foot-Operated Air Control Valve with and without Pedal Guard

Constructed to operate with air pressures from 25 to 150 p.s.i., the valve is available in ½ and ¾-inch sizes.

"Fluid-Shaft" Electric Motor

Said to offer many advantages wherever loads require smooth acceleration, protection from "jamming" and shocks, or are difficult to start, an electric motor to be known as the "Fluid-Shaft" has been announced by the Reuland Electric Co., 3001 W. Mission Rd., Alhambra, Calif. Typical applications for the motor include conveyors, extractors, bridge and trolley drives on cranes, winders, and mixers, and so on.

Constructed to absorb all starting and operating shocks in a cushion of oil, the unit features a single frame, integral design of motor and fluid-drive coupling and is available in ½, ¾, 1, 1½, 2, 3, 5, 7½, and 10 h.p. sizes with standard foot mounted or round body frames. The unit can be mounted horizontally or vertically or with N.E.M.A. flange and face type end bells. A Fluid-Shaft Motoreducer providing a fluid-drive, electric motor, and

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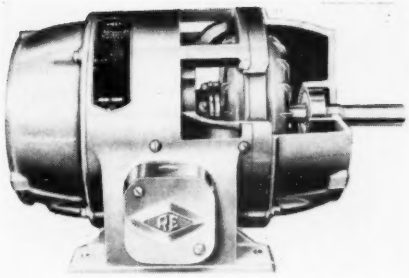


Reuland "Fluid-Shaft" Electric Motor

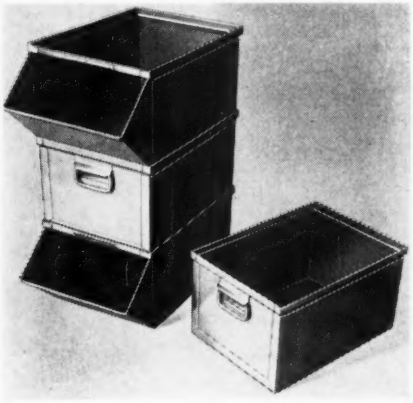
gears for low output speeds in one compact power package is available in either a single or double reduction type.

Tote Box

Individually useful or interchangeable with hopper front Stackbins, a straight-sided tote box designed for the protective, yet easily accessible, storage of parts and handy transporting of parts between processing points has been placed on the market by the Stackbin Corp., 1038 Main St., Pawtucket, R. I. Stacking rims allow for the rigid nesting of tote boxes on a floor or bench.

Constructed of welded steel with drop handles, the Stackbin Tote Box is available in seven standard sizes from 3½ inches wide x 6 inches long x 3¼ inches

Illustration Showing Stackbin Tote Box, Including Its Use with Hopper Front Stackbins



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The Illuminated MAGNIFIER for Precision Inspection

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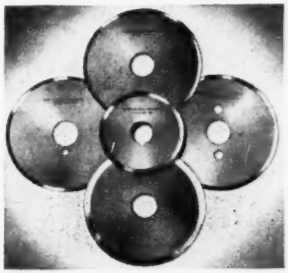
FASTER



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Continental Steel Cut-Off Wheels, available for all makes of rotary cut-off machines, provide increased production . . . at modest cost.

Discs 7" dia., 3/32" and 1/8" thick carried in stock. Bore 1 7/8", 1 1/2", or 1 3/4". Special sizes made quickly. Write for folder and prices.

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high to 15 inches wide x 24 inches long x 11 inches high. Special sizes of the box are available to order.

Layout Ink

A machinist's ink for design layout work, designated as Kempro Design Layout Ink, has been placed on the market by the Protective Coatings Corp., Northwest Highway, Des Plaines, Ill. The ink is packed in a 12-oz. can under pressure and is sprayed on the layout surface by merely pressing a button. It is said to dry quickly with excellent adhesion to all metals, as well as other materials. After drying to a thin, hard, non-glare film, the ink is claimed to provide an ideal surface for design layouts which is both heatproof and resistant to cutting oils.

Said to minimize waste since the unused portion is always under cover and not subject to inadvertent drying, Kempro Design Layout Ink may be easily removed with lacquer solvent, toluol or xylol.

Kempro Design Layout Ink in Use

Thread Measuring Device

A device for measuring screw threads to micrometer exactness has been announced by W. T. Simmons, Box 364, Amarillo, Texas. The device consists of a connected pair of hardened precision ground triangular steel bars with points truncated to clear the root of the thread being measured. The two bars are placed one in each side of the screw thread and

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Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

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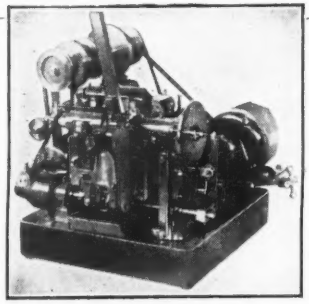


WALTHAM

Pinion and Gear Cutting Machines

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1½" dia. Blanks are held and indexed by work spindle and usually supported by a tail center. Only straight teeth can be cut. *Write for Bulletin No. 112.*

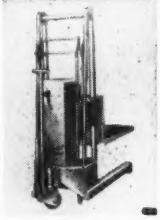
WALTHAM MACHINE WORKS

WALTHAM MASS.

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery.

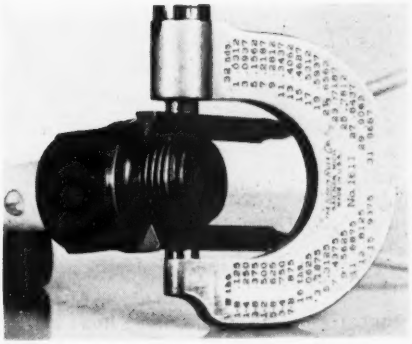
LYON - Raymond

HYDRAULIC High-Lift Trucks



LYON-Raymond CORPORATION

3922 Madison St. Greene, N. Y.



Simmons Screw Thread Measuring Device in Use

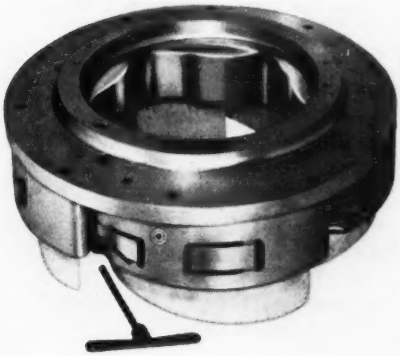
a micrometer measurement taken across them, as shown in the accompanying illustration.

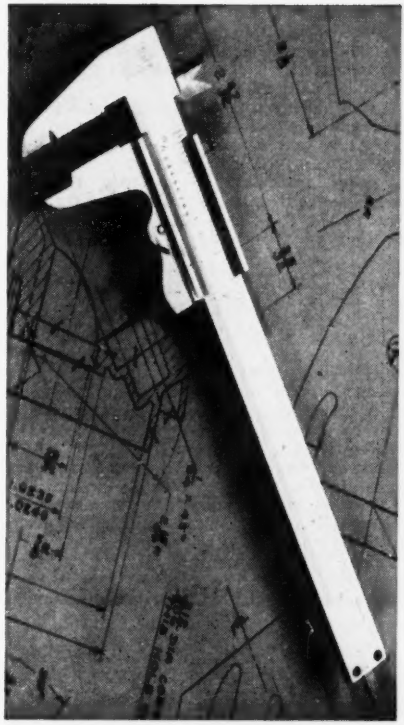
The device can be used to measure all standard or special 60-degree threads from 4 to 56 pitch using standard micrometers, and is furnished complete with a simplified chart for facilitating all computations.

Segmental Grinding Chuck

A segmental grinding chuck which is claimed to provide for unusually fast cutting together with the production of high quality finishes is being manufactured under the designation AA by the Abrasive Machine Tool Co., East Provi-

AA Segmental Grinding Chuck





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Send me 1 ELMAG VERNIER CALIPER at $18 C.O.D. If unsatisfactory it is understood that I can return it within 10 days and money will be refunded.

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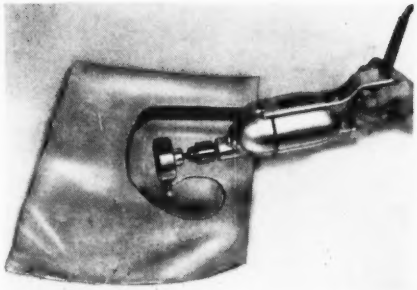
dence 14, R. I. The chuck is standardized in basic design so that two sizes of abrasive segments cover all grinding wheel requirements for vertical and horizontal spindle face grinders.

The sharp pointed segments are placed in circular echelon overlap formation and are arranged to cut with a rapid sweeping action which throws out chips and dirt as the chuck revolves. Segment waste is said to be reduced to a minimum due to the unique design of the segment holders.

Metal Cutting Head

Known as the "Nibblex," an electrically operated, unusually maneuverable sheet metal cutting head which is said to be capable of making circular cuts with radii as small as 1 inch is being marketed by the Detroit Industrial Products Co., 8827 Strathmoor Ave., Detroit 28, Mich. Designed to cut up to 18 gauge steel and iron sheets, the head can be used with a ¼-inch electric hand drill, a flexible shaft with ¼-inch chuck, or on a drill press, milling machine, and so on.

The Nibblex, which has an average speed at 2,000 r.p.m. of 7 feet per minute, can be used to cut corrugated sheets without deforming the corrugations, as well as pipes and tubes within its capacity. The head is said to leave an edge that is completely free from burrs, bending, and drawing.



"Nibblex" Sheet Metal Cutting Head in Use

Flush Pin Gage

A flush pin gage which can be readily set to the size required for the job at hand has been brought out by the Maywood Industrial Engineering Co., 36 New

Over 40
FORD CARBIDE CUTTER SHAPES
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CARBIDE ROTARY CUTTERS
—MACHINE GROUND
For filing, grinding and finishing, burring, countersinking and chamfering, light milling, profiling, tool, die and mold machining, Ford carbide cutters will do a better job in less time at a lower cost—and without a major capital investment. Send for Bulletin C-549—Sizes and Specifications.
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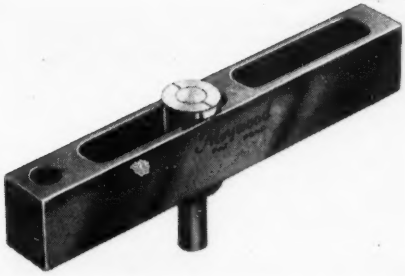


Maywood Flush Pin Gage

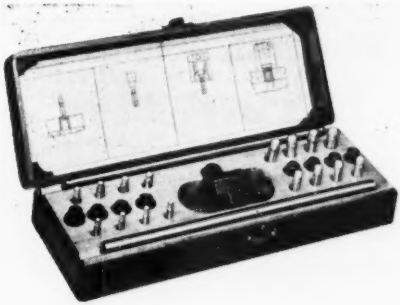
Dwight St., Springfield, Mass. The gage pins can be adjusted 0.250 inch in the smaller sizes and 0.500 inch in the larger sizes. A range of adjustment from ½ inch minimum to 3½ inches maximum is covered by a set of eight separate pin assemblies. The gage bodies provide for a range of adjustment from 4 inches minimum to 10 inches maximum. In addition to adjustment for pin length, the location of the pin in relation to the gage body can be changed.

The Maywood Flush Pin Gage is made entirely of oil hardened tool steel (Rockwell C 62-65) which is ground and lapped parallel and square and is provided with a Pentrate blue-black rust-resistant finish. Where extremely close tolerances must be checked, and indicator adapter is available for the gage.

Pierce Die "Button" Extractor

Punch press down time during the removal of pierce die inserts is said to be reduced to a minimum through the use

"EZ-Pul" Pierce Die "Button" Extractor Set



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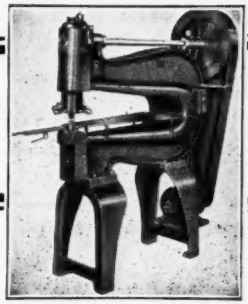

Capacity ¾" mild steel

FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEMPLATE OR TO A SCRIBED LINE.

Manufactured by

W. J. SAVAGE COMPANY

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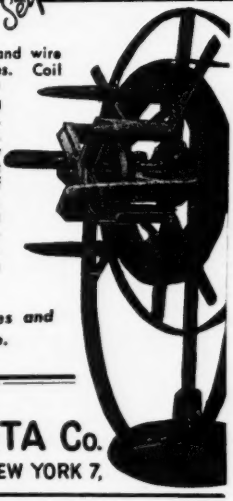
Since 1885

Pioneer Mnfrs. of Nibbling Machines

WESTLEN *Adjustable Self Centering* REELS



For feeding strip and wire coil stock to presses. Coil capacity 300 to 500 lbs. Outside ring dia., 28" to 36". Height of reel, 36". Wheel automatically adjusts parts to suit inside diameter of coils from 11" to 20". Arm allows for quick conversion to horizontal or vertical position and adjusts height of reel.

Write for prices and literature.

The RULETA Co.

27 WARREN ST. NEW YORK 7,

of the "EZ-Pul" Pierce Die "Button" Extractor announced by L. C. Ball Associates Inc., 2276 BF, National Bank Bldg., Detroit 26, Mich. With the extractor, only four simple steps are said to be required to pull straight or taper hole inserts without removing dies or die sections from the press. The tool can also be used for the quick removal of bearings, bushings, liners, and sleeves.

All members of the tool are hardened, with precision ground working surfaces to assure easy, dependable operation. Two standard sets are available for pulling inserts from 0.2031 through 0.7031 inch. Special extractors for individual problems can also be obtained.

Thermal Comparator

For measuring the expansion of dissimilar metals, the Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio,

Webber Thermal Comparator

has prepared a slide rule, known as the Webber Thermal Comparator, that is designed to provide an instant reading of the expansion difference between gage blocks and work at various shop temperatures. To use, the tool or diemaker merely sets up the gage block measurement in the small window of the comparator and obtains a reading that will indicate the difference of expansion or contraction between the gage block and work at 68 degrees. The part is then made larger or smaller by the amount shown on the scale. The upper half of the comparator is for use with steel gage blocks and the lower half for use with carbide gage blocks.

The thermal comparator is now fur-

CAMS

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We Solicit Your Inquiries.

BLOOMFIELD TOOL CORP.

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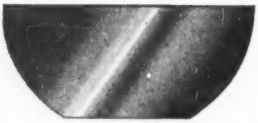


We manufacture a complete line of Woodruff keys in all standard sizes. These sizes range from as small as ⅛" x 1/16" to keys as large as 3½" x ¾". All keys are carefully checked for burrs, slivers, etc. before being shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine racks.

STANDARD STEEL SPECIALTY COMPANY

BEAVER FALLS PENNSYLVANIA

PLANTS: BEAVER FALLS, PA. • HAMMOND, IND.

RUSTLESS SWISS VERNIER CALIPERS

Precision built, best quality. Long jaws & slides, adjustable gibs. Maximum error .0001" at 20° C. Jaw flatness: .000008"! Larger diameter capacity by ⅛" to 8½". 5-Different models. Full details on request. Write today.

G. HOTINE

461 Sixth Avenue Brooklyn 15, N. Y.

Phone: Sterling 8-9473

nished with all Webber carbide gage block sets and can also be obtained separately at a price of $1.00.

Round Nose Boring Tool

Kennametal Inc., Latrobe, Pa., announces a roundnose tool (Style 16T) for boring in a trough by plunging and feeding both ways. The tool is available in two sizes: 1 inch wide x 1¼ inches high x 12 inches long and 1 inch wide x 1½ inches high x 12 inches long. The brazed-on Kennametal tip of each size has a

Kennametal Style 16T Boring Tool

¼-inch radius at the extreme point, blending into a 1½-inch radius at each side. Tips are supplied in two grades.

Combination Slip-Joint Pliers

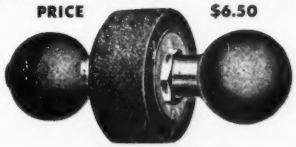
A combination slip-joint pliers featuring overall slimness, lightweight, and sufficient leverage to meet general service

Williams Combination Slip-Joint Pliers

requirements is being offered in 5, 6, 8, and 10-inch sizes by J. H. Williams & Co., 400 Vulcan St., Buffalo 7. N. Y. A 7-inch size is also made with side cutter.

The pliers is made of special high carbon steel which is heat treated after forging in such a manner as to avoid decarburization of the jaw and joint areas, thus assuring long life for the broached teeth in the jaw gripping surfaces, it is stated. Nail cutters are of unusual design in that one side of the cutter employs fine serrations to grip and hold the nail or wire from slipping during cutting operations. The accurately aligned cutters are

METCALF WHEEL DRESSERS
PRICE $6.50



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A minute with a Metcalf saves hours of production time. Extra wheels, $1.25 each.
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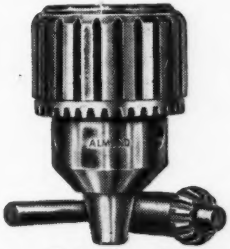


Maximum Gripping Power with Extreme Accuracy and Long Life.
Write for Catalog.

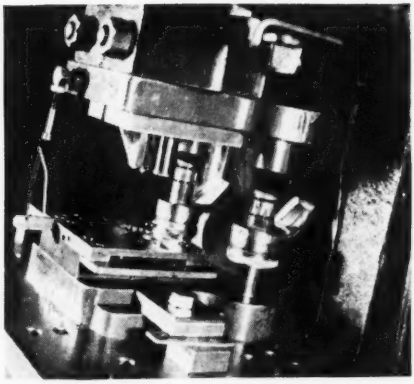
T. R. Almond Mfg. Co.
Ashburnham, Mass.
U. S. A.

machined and hand sharpened to an edge which is said to provide for maximum service life.

The pliers are finished in bright nickel plate with jaw and handle areas buffed bright.

Leader Pin Oiler

The Acro Metal Stamping Co., 332 E. Reservoir Ave., Milwaukee 12, Wis., has developed a product for automatically lubricating die set leader pins. The product consists of an oil well which is designed to slip over the leader pin and can be easily adjusted to proper height and tightened. After filling with oil, the oiler is said to require no further adjustment.

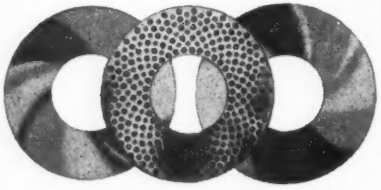


Arco Leader Pin Oilers Installed on a Press

Interchangeable on any die sets having the same diameter pins, the oiler is claimed to provide a constant cushion of oil between the pin and bushing regardless of press speed. Oil is transmitted to the pin by capillary action on each upward stroke of the press. The oiler is available in a range of sizes to fit various leader pin diameters.

Power Ram

A power ram with hydraulic pump that can be operated by hand or foot pressure has been placed on the market by the J. O. Stephenson Foundry & Mfg. Co., 548 E. Fort St., Detroit 26, Mich. Known as the "Step-Draulic," the ram can be used for a wide variety of jobs, such as



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WITH BRONZE RETAINERS

These bearings range from ½" to 3½" shaft diameter; from 1-7/32" to 5-7/32" outside diameter. Larger sizes can be made to 25" outside diameter.

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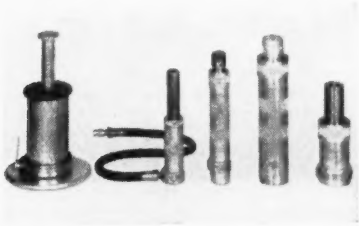
the disassembly and repair of dies, the clamping or operation of fixtures, and general repair and maintenance work.



Stephenson "Step-Draulic" Power Rams

The ram, which can be installed directly in fixtures by using the retaining collar threads, is supplied in lengths from 1½ inches collapsed to 15⅞ inches extended with mounting threads for conventional tools. The ram varies in capacity from 2 to 12 tons, according to the diameter, and is designed for maximum working pressures in excess of 10,000 p.s.i. All sizes of the ram have plated finishes, with plungers and spacing anvils case hardened.

Metal Marking Typewriter

Known as the "Automark," an electric metal marking typewriter for the detailed marking of name plates has been placed on the market by the Cadillac

"Automark" Electric Metal Marking Typewriter

Stamp Co., Dept. MA-5, 2138 Riopelle, Detroit 7, Mich. In addition to marking on metal, the unit can be easily adjusted

ANY SPEED INSTANTLY—
300 to 5000 R.P.M.

Speed-Right

Controlled-Speed 16" Drilling Machine with Finger-Tip Control for instant speed changes • Micro Depth Switch to assure positive setting • Direct or Motor-Geared Drive • Built-In ½ H.P. Motor.

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For High Speed Small Hole Drilling—.004" to .156" Manual and air feed drilling machines feature controlled uniform spindle speed 1000-10,000, 2500-15,000 R.P.M. Priced from $124.00 complete.

THE ELECTRO-MECHANO CO.
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to perform the same type of intaglio marking on other materials.

Claimed to be sturdy enough to permit the marking of steel (before hardening) up to ½ inch thick, the Automark is electrically operated with automatic table feed. The letter wheel is made from high grade alloy steel and is designed to accommodate type from 1/32 to ¼ inch. Various sizes of letter wheels can be quickly and easily inserted in the machine, which is designed to produce clear-cut markings with a light touch on the keys.

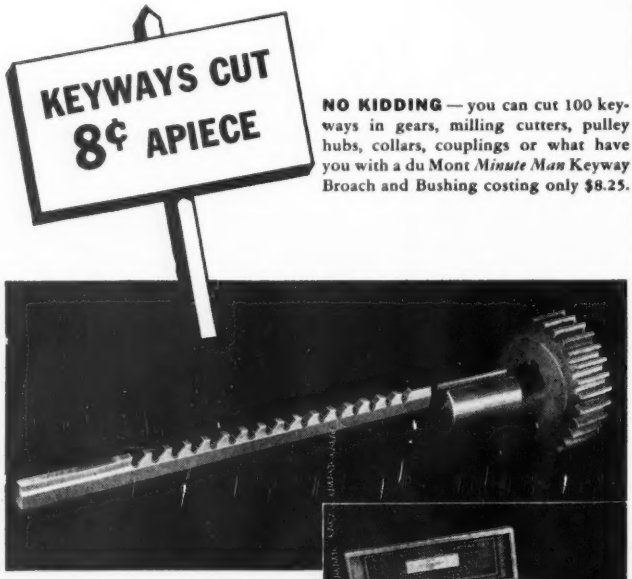
New Films

Carbide Tool Practice Slide Films

Kits containing a set of six educational, discussion-type slide films covering carbide single-point tool practice are now available from the Carboloy Tool Co., Inc., 11143 E. 8 Mile Rd., Detroit 32, Mich. Based on information contained in the company's recently released carbide tool manual, the films, which supersede and greatly amplify a set of films on similar subjects released during the war, cover such topics as: What Is Cemented Carbide; Designing Single-Point Carboloy Tools; Brazing Carboloy Tools; Designing and Grinding Chip Breakers in Carboloy Tools; Grinding Single-Point Carboloy Tools; and Application of Carboloy Tools and Trouble Shooting.

Included in each kit are six booklets which contain sections from the Carboloy tool manual covering and supplementing material presented in the films. Besides permitting a more detailed study of the carbide "know how" set forth in the films, these individual booklets are said to be handy for reference in the shop. With each kit there is also a booklet presenting detailed instructions on how to obtain best results when using the slide films for group instruction.

The price of the complete kit containing six films and seven booklets is $15.00. Any number of extra copies of the booklets are available for the nominal charge of 10 cents each.



NO KIDDING — you can cut 100 keyways in gears, milling cutters, pulley hubs, collars, couplings or what have you with a du Mont *Minute Man* Keyway Broach and Bushing costing only $8.25.

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Greenfield, Massachusetts

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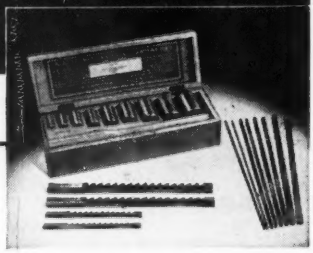

IN ONE MINUTE

WITH OUR KITS you can cut keyways from 1/16" to 3/4" wide in bores from 1/4" to 3" by 1/16" steps. Pay for themselves the first few times used. Get all the dope on these time and money saving tools.

New Books

Stainless Steels. By Carl A. Zapffe. Published by American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. 368 pages. Illustrated. Cloth binding, board covers. Price, $5.00.

This volume includes seven chapters which provide data on the historical background of the stainless steels; the corrosion resistance of the stainless steels; the metallurgical constitution of the stainless steels; the various classes of stainless steels, including martensitic, ferritic, and austenitic; and production, fabrication and finishing of the stainless steels. The book also provides a glossary, bibliography, author index, and subject index.

Weld Design. By Harry D. Churchill and John B. Austin. Published by Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. 216 pages. Illustrated. Cloth binding, board covers. Price, $6.65.

Recommended for publication by the jury of award in the textbook award program of The James F. Lincoln Arc Welding Foundation, this book is intended to fulfill a definite need for a concise volume on welded machine-base design. Subjects covered include construction materials of machine bases; stress analysis and design; designing arc-welded machine bases; application of welded-design principles; welding specifications; weldery procedure; welding processes; flame cutting and flame hardening; forming of metals; and estimating welded machine-base costs. An appendix provides a comprehensive list of magazine articles, pamphlets, and books bearing upon the subject of welded-machine design and related matter.

Standards of Tubular Exchanger Manufacturers Association. Published by Tubular Exchanger Manufacturers Association, Inc., 53 Park Place, New York 7, N. Y. 94 pages. Wire binding. Price, $3.00 for paper cover edition and $4.00 for Fabrikoid cover edition.

Said to be of value to anyone concerned with the design, manufacture, specification, purchase, operation, or maintenance of tubular heat exchangers, this comprehensive, profusely illustrated volume covers such subjects as fabrication

and performance; mechanical standards for petroleum refineries, commercial and general process applications; material specifications; fouling factors, temperature and temperature differences; heat transfer and pressure drop data; thermal properties of fluids; installation, operation and maintenance; and characteristics of tubing.

The Story of Magnesium. By W. H. Gross. Published by American Society for Metals, 7301 Euclid Ave., Cleveland, Ohio. 262 pages, 5¼ x 7¾ inches. 100 illustrations. Price, $2.00.

Designed for the layman rather than the scientific or technical specialist, this volume discusses the methods of making magnesium from salt water, the properties of the metal and its alloys, and the processes whereby the ingots can be converted into washing machines, vacuum sweepers, and hundreds of other forms. It is stated that the author has achieved a combination of simplicity, accuracy, and readability to which over 100 illustrations and diagrams have been added, thus making the book an excellent reference source for such processes as the casting, fabrication, machining, joining, surface finishing, riveting and welding of magnesium.

Apprentice Training Standards. Published by National Machine Tool Builders' Association, 10525 Carnegie Ave., Cleveland 6, Ohio. Price, $2.00.

The result of over a year of study by the N.M.T.B.A. Committee on Apprentice Training of which J. Edward Goss, industrial activities administrator of Brown & Sharpe Manufacturing Company, is chairman, this book is a working manual for setting up and conducting an apprentice training course. It specifies in detail the nature of the work to be done by the apprentice and contains samples of the forms required, including the application for apprenticeship, the apprenticeship agreement, and the work records required. It also includes an ample bibliography on the subject of machine tool practice and apprentice training.

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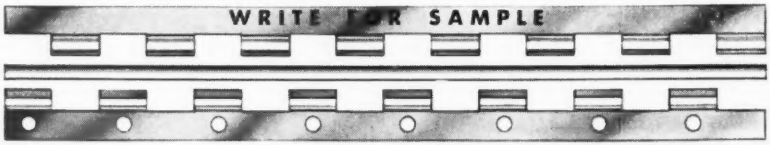

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New Shop Literature

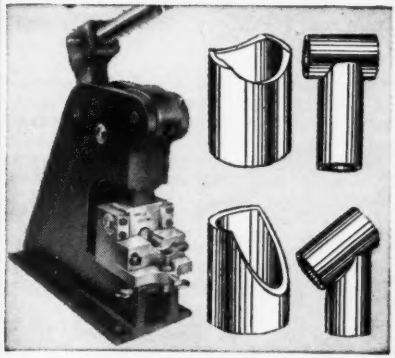
The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning MODERN MACHINE SHOP when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Magnetic Chuck Control, known as the "Neu-T-rol" and designed to facilitate the removal of the workpiece at the completion of the grinding operation, is fully illustrated and described in an eight-page two-color bulletin (No. 21) published by the Electro-Matic Products Co., 2237 N. Knox Ave., Chicago 39, Ill. Covered are manual controlled models primarily designed for the smaller sizes of electromagnetic chucks ranging from 4 x 8-inch rectangular size up to 7 x 24 and 8 x 22 inches and circular chucks up to 14 inches in diameter; also, motor controlled models arranged for remote control with finger-tip operation and designed for the larger size electromagnetic chucks.

"The Production Story" is the title of an eight-page booklet released by the Production Machine Co., Greenfield, Mass., which describes the company's background and experience and illustrates and describes its principal products; namely, centerless polishing, buffing, and finishing machines and abrasive belt surfacing machines for metal and other materials. The back page of the booklet includes two views of an experimental laboratory recently completed by the company.

Historical Folder and Direct Reading Power Chart. The Cincinnati Bickford Tool Co., Cincinnati 9, Ohio, manufacturer of upright, jig boring, and radial drilling machines, has announced its 75th anniversary of service to industry by transmitting to the machine tool trade a historical folder and a direct reading power chart. The illustrated folder affords a pictorial presentation of the development and progress of the company since 1874. The direct reading power chart and drilling time indicator provides a convenient, time-saving, pocket-size visual calculator for use in estimating and engineering departments.

NOTCH
TUBING OR PIPE
in 5 Seconds
WITH
ARC•FIT



Faster than old methods which take from 10 to 20 minutes more, this patented shearing tool forms a joint for brazing or welding with no deformation of pipe or tubing.

The Arc-Fit quickly shears away the desired sections of pipe so that it will conform perfectly to the outer contour of the opposing piece, as illustrated.

Eliminates the need for grinding or finishing.

Made in standard pipe sizes up to 2", it can be used in the 90 lb. Arc-Fit hand press as shown or in your own power punch press.

Arc-Fit can also be supplied to meet specifications for special notching jobs.

Learn about Arc-Fit today. Write for NEW ILLUSTRATED FOLDER. Dept. MM.

Manufactured Exclusively By

Vogel TOOL & DIE CORP.
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"Stop Scrap Two Ways" is the title of two-color bulletin prepared by the Balas Collet Mfg. Co., Dept. MM, 1557 E. 27th St., Cleveland 14, Ohio, which illustrates and describes stock stops for Brown & Sharpe machines.

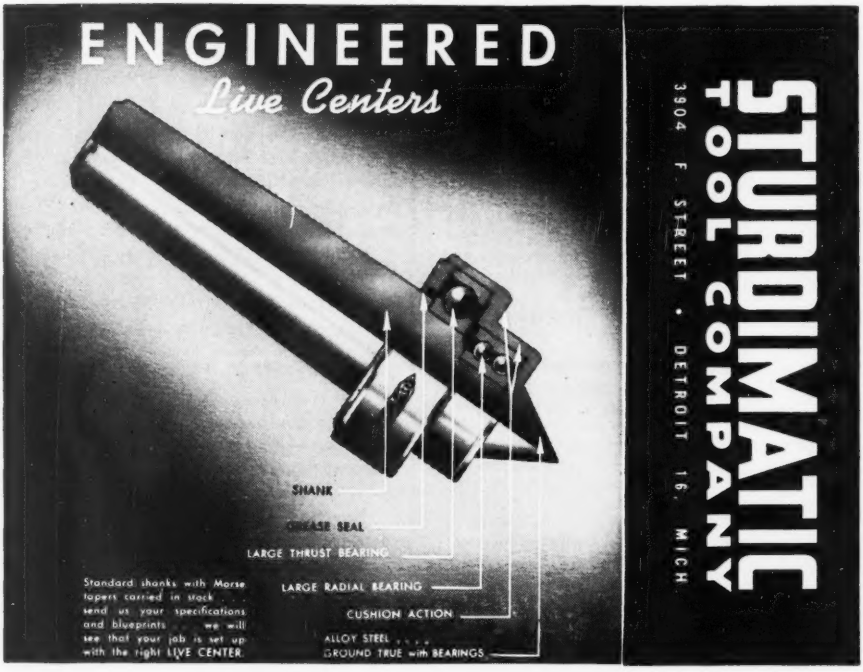
Flexible Shafts. Wyzenbeek & Staff, Inc., 852 W. Hubbard St., Chicago 32, Ill., is now distributing a catalog (No. 50) containing complete information on flexible shafts and grinders. Many new model single and multiple-speed flexible shaft machines are illustrated and described, as well as parts and accessories for grinding, sanding, wire brushing, polishing, deburring, and many other operations.

Open Back Inclinable Power Presses of the geared and non-geared types for blanking, forming, drawing, assembly, and other operations, are covered as to design features, dimensions, specifications, and so on, in an eight-page two-color bulletin (No. 211) distributed by the Clearing Machine Corp., 6499 W. 65th St., Chicago 38, Illinois.

Thread Milling Cutters for Pratt & Whitney Thread Milling Machines are illustrated, described, and listed as to specifications, sizes, and prices in a four-page, two-color circular (No. 522) published by Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Connecticut.

V-Grooved Wheel Casters for angle iron track are fully covered in an eight-page two-color illustrated folder distributed by The Bassick Co., Bridgeport, Connecticut.

Spun Steel Cylinders, Containers, and Tubing Specialists. A 16-page three-color booklet outlining its facilities for manufacturing stainless steel tubing into completed seamless steel cylinders for compressed gases or other purposes has been published by The Marison Co., P. O. Box 178, Elgin, Ill. Included are illustrations and descriptions of the wide range of types, designs, pressures, and capacities in which steel cylinders and containers can be produced.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Ultrasonic Testing Instrument. A four-page two-color bulletin (No. 50-105) announced by Sperry Products, Inc., Danbury, Conn., illustrates and describes the Type UR Reflectoscope, an ultrasonic instrument for instantaneously locating defects in metals and other materials by the application of a single "searching unit."

Linear Actuator. The Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J., has issued a four-page two-color bulletin illustrating and describing its improved model "Lineator," an electrically powered linear actuator, or motorized screw jack, intended to impart straight line force in either tension or compression.

Wire Rope. A four-page two-color folder (No. 49-30) cataloging 133 different sizes and types of corrosion-resisting preformed wire rope has been released by the Macwhyte Co., Kenosha, Wis. Typical uses for each rope are listed, and the various types available are described and illustrated.

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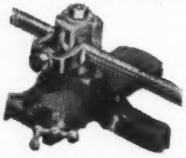
The First MAJOR Holder IMPROVEMENT In 25 Years

GLOBE BORING BAR HOLDER

Exclusive dual clamping arrangement permits independent adjustment of bar or alignment of holder—either may be made without disturbing the other. For lathes from 8" to 36" swing.



COMPLETE SETS
(With three bars)

Set No.	Diameter Bar Inches	Tool Bit Inches Square	For Lathe Swing Approx.	Price Complete
0-AA	*3/8, 1/2, 3/4	*, 5/16, 1/4	8" to 12"	$ 16.40
1-A	1/2, 3/4, 1 1/8	5/16, 1/4, 3/8	12" to 16"	26.35
2-A	5/8, 1 1/8, 1 5/8	5/16, 5/16, 3/8	16" to 18"	35.15
3-A	3/4, 1 1/8, 1 1/2	1/4, 3/8, 1/2	20" to 22"	61.55
4-A	1 1/8, 1 5/8, 1 7/8	5/16, 3/8, 5/8	24" to 36"	87.95
6-A	1 1/2, 1 7/8, 2 1/2	1/2, 5/8, 3/4	24" to 36"	193.50

* 3/8" diameter bar included in set is solid tool steel.

GLOBE BORING BARS
(Calibrated)

Bar No.	Dia.	Length	Tool Bit	Price
162A	3/8"	7"	1/8	$3.50
122A	1/2"	8"	5/16	3.50
123A	5/8"	9"	5/16	3.50
124A	5/8"	10"	5/16	3.50
125A	3/4"	11"	1/4	4.35
126A	1 1/8"	13"	5/16	6.30
127A	1"	14"	5/16	6.30
128A	1 1/8"	16"	3/8	8.75
129A	1 5/8"	18"	3/8	12.30
130A	1 1/2"	23"	1/2	16.30
176A	1 7/8"	30"	5/8	36.35
155A	2 1/2"	36"	3/4	72.70

Permanently graduated in 1/4" calibrations indicating depth of bore. Eliminates necessity for file and chalk marks.

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HIGH SPEED CUTTER BITS

1/8x1/2	1/8x2 1/2	5/16x1/2	5/16x1 1/4	5/16x2 1/2	1/4x1 1/4	1/4x2 1/2
.20	.30	.20	.25	.30	.25	.35

5/16x1 1/4	5/16x2 1/2	3/8x1 1/2	1 1/2x2	5/8x2 1/4	5/8x4 1/2	3/4x2 1/2
.30	.45	.40	.85	1.25	2.25	2.15

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Automatic Drilling and Tapping Units featuring centrifugal feeding action with full hydraulic control are covered in detail in an eight-page two-color brochure issued by The Govro-Nelson Co., 1931 Antoinette, Detroit 8, Michigan.

"Dot-Weld" Process for reclaiming defective castings and repairing cracked castings and motor blocks is fully explained in an eight-page two-color fully illustrated catalog prepared by the Metallizing Company of America, 3520 W. Carroll Ave., Chicago 7, Illinois.

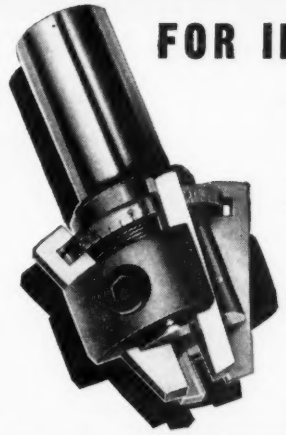
"Radiant-Tube Heating of Controlled-Atmosphere Heat Treat Furnaces" is the title of an eight-page illustrated bulletin announced by Holcroft & Co., 6545 Epworth Blvd., Detroit 10, Mich. The bulletin discusses the development and design of radiant tubes which may be heated by gas, oil, or electricity, and the advantages provided by this heating method for controlled-atmosphere furnaces.

Inert-Gas Shielded Metallic Arc Welding Process known as the "Aircomatic" and designed for the welding of stainless steel, aluminum, and aluminum bronze is fully discussed in a four-page two-color illustrated folder distributed by the Air Reduction Sales Co., 60 E. 42nd St., New York 17, New York.

Gas-Fired Forge Furnaces are described and illustrated in a four-page bulletin (No. E-3) issued by the Eclipse Fuel Engineering Co., Rockford, Ill. The bulletin also shows blowers, mixers, diluters, and air control valves which can be used in conjunction with the forge furnaces, and includes installation diagrams and specifications.

"New Developments in Honing" is the title of a 16-page two-color bulletin published by the Micromatic Hone Corp., 8100 Schoolcraft, Detroit 4, Mich., which reviews the fundamental principles of the honing process and describes modern applications of honing and recently developed equipment that has greatly speeded up the process and increased its accuracy.

KUTMORE ADJUSTABLE HOLLOW MILLS



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- Blades quickly resharpened in complete sets with Kutmore Fixture

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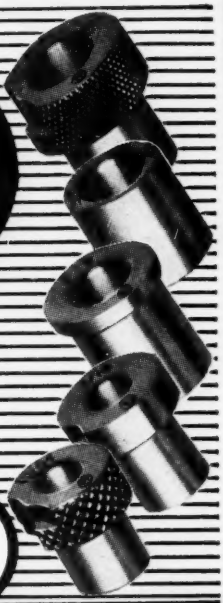

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Machine Tool Catalog (German Language). Amertool Services, Inc., Cincinnati 9, Ohio, has published an 84-page plastic-bound catalog (No. M-1682-G) in the German language which illustrates and describes machine tools and accessory equipment manufactured by the following companies: The Blanchard Machine Co.; The Cincinnati Bickford Tool Co; The Cincinnati Milling Machine Co.; Cincinnati Grinders Inc.; The Cincinnati Planer Co.; The Cincinnati Shaper Co.; Cone Automatic Machine Co., Inc.; The Fellows Gear Shaper Co.; Giddings & Lewis Machine Tool Co.; Gould & Eberhardt Inc.; The Heald Machine Co.; The Hydraulic Press Mfg. Co.; Jones & Lamson Machine Co.; Kaukauna Machine Corp.; The Monarch Machine Tool Co.; and The Thompson Grinder Co. Copies of the catalog are available from Amertool or from Stenzel & Co., 25 Richard Wagner St., Wiesbaden, Germany.

Static Universal Balancing Machine, product of the Taylor Dynamometer & Machine Co., 5108 W. Center Street, Milwaukee 10, Wis., is illustrated and described in detail in a six-page two-color bulletin issued by this firm.

Hydraulic Presses. A 12-page bulletin (No. 1010-B) released by the Elmes Engineering Division of American Steel Foundries, Cincinnati 29, Ohio, covers hydraulic metal-working presses featuring electric control which provides for semi-automatic operation, automatic operation, and inching, with speed change and reversal of slide governed either by ram travel or pressure.

"Notch Tubing and Pipe Ends Easily" is the title of a four-page two-color folder issued by the Vogel Tool & Die Corp., 2529 W. Moffat St., Chicago 47, Ill. which illustrates and describes the "Arc-Fit," a precision-built shearing tool designed for preparing the ends of tubing or pipe in the production of welded or brazed tubular tee or angle joints. Data on operation, sizes, and specifications are included. In addition, a separate price list is provided on the various components of the Arc-Fit.

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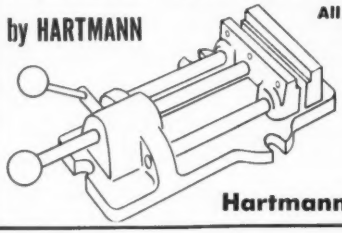

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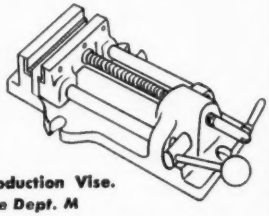

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Broach Sharpening Machine, available in two models for the resharpening of broaches up to 9 inches in diameter and 60 and 84 inches in length respectively, is covered as to operation, features, and specifications in a four-page three-color circular No. (800) published by the American Broach & Machine Co., Ann Arbor, Michigan.

Universal Electric Portable Power Tools. Catalog E-2 released by the Independent Pnuematic Tool Co., 175 State St., Aurora, Ill., provides complete data, including prices, on its entire Thor line of universal electric portable power tools.

Non-Ferrous Alloys. A 44-page pocket-size handbook published by The Riverside Metal Co., Riverside, N. J., provides data on the advantages, applications, composition, forms, properties, and manufacturing limits of Riverside alloys —phosphor bronze, nickel silver, cupro nickel, beryllium copper, and special alloys. Also provided is useful information on temper and data on gauges, tolerances, and weights of sheets, rods, and wire. A handy check list and order form is contained in a separate pocket at the rear of the handbook.

Hinges. An attractive eight-page pocket-size catalog published by the S & S Hinge and Metal Products Co., Dept. M, 4727 Iowa St., Chicago 51, Ill., presents illustrations and tabular data on a line of hinges for cabinets, cases, luggage, guards, and so on. Types of hinges covered include steel butt, trimmed, countersunk, mirror, and continuous hinges, as well as hinges for spot welding. Also treated are metal loops and hangers.

Tools for Die Work. A six-page pocket-size folder published by the C. E. Craley Tool Co., Dept. MMS, 110 Chestnut St., Shillington, Pa., illustrates and describes an extension collet holder and a spring scriber for fine die work.

Mechanics' Hand Tools. The Cincinnati Tool Co., 1947 Waverly Ave., Cincinnati 12, Ohio, has published a 40-page catalog containing illustrated, descriptive, and tabular information on its Hargrave line of mechanics' hand tools, including various types of chisels, clamps, cutters, drills, punches, wrenches, file cleaners, rivet busters, and so on. Also covered are chucks for power hammers, clamp parts, and saw vises.

Vertical Boring and Turning Machines. A series of four two-color fully-illustrated catalogs containing complete descriptive and specification data on King vertical boring and turning machines has been released by American Steel Foundries, King Machine Tool Division, Cincinnati 29, Ohio. Catalog K-1 covers 30, 36, and 42-inch size machines; Catalog K-2, 52, 62, and 72-inch machines; Catalog K-3, 84 and 100-inch size machines; and Catalog K-4, 120 and 144-inch size machines.

"Modern Metal Finishing." Resumption of publication of "Modern Metal Finishing," a technical bulletin reporting timely and useful developments in the treatment of metals, has been announced by E. I. du Pont de Nemours & Co., Wilmington, Del. The bulletin, to be issued at regular intervals, will contain articles on electroplating, descaling, metal cleaning, and heat treating.

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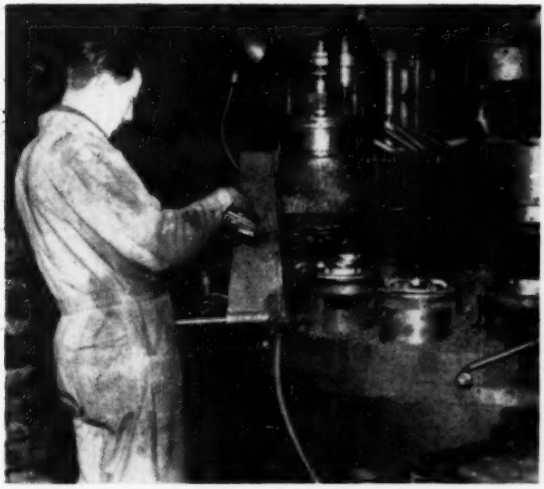

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Rotary Converters. An eight-page two-color bulletin (No. 13-29) issued by the Janette Mfg. Co., 556 W. Monroe St., Chicago 6, Ill., illustrates and describes the company's latest models of rotary converters for converting direct current to alternating current.

Standard Code Symbol Stamps for identifying inspectors, operations, workmen, and dates, as well as specially designed stamps for indicating acceptance, rejection, deviation, and other inspection markings, are illustrated and described in a four-page two-color folder issued by the M. E. Cunningham Co., 158 E Carson St., Pittsburgh 3, Pennsylvania.

Hollow Spindle Lathes, available in 16 and 20-inch sizes, are illustrated and described as to construction features and specifications in a four-page two-color bulletin (No. HS-111) published by The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio.

Wire and Metal Forming Machines, including standard four-slide wire forming machines, combination press and four-slide forming machines, heavy duty metal forming presses, and automatic staple forming machines, are described and illustrated in an eight-page two-color bulletin (No. 60) issued by The A. H. Nilson Machine Co., Bridgeport, Conn.

Standard Hydraulic Metal-Working Presses available in 100, 150, and 200-ton capacities for drawing, forming, straightening, bending, coining, and other shop operations are fully described in a four-page two-color illustrated bulletin (No. 749) prepared by the Lake Erie Engineering Corp., 325 Woodward Ave., Buffalo 17, New York.

Profile Grinder designed for fast and accurate metal grinding and featuring two speeds, large table, guarded wheels, tilting spindle, dust collecting facilities, and oscillating and non-oscillating spindle arrangement is pictured and described in a two-color bulletin now being distributed by The Kindt-Collins Co., 12651 Elmwood Ave., Cleveland 11, Ohio.

Rotary Automatic, identified as the "Super" and designed for grinding, polishing, buffing, and deburring operations, is illustrated and described in a four-page two-color bulletin (No. 45) distributed by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Michigan.

Bonded Disc Wheel for rotary sanders, to be known as the Manhattan Moldisc, is fully described in Bulletin No. 6901-A now available from the Abrasive Wheel Department, Raybestos-Manhattan, Inc., Manhattan Rubber Div., Passaic, New Jersey.

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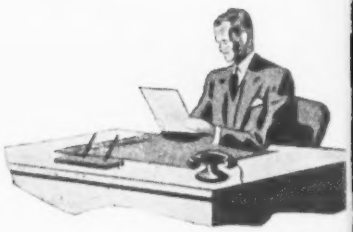

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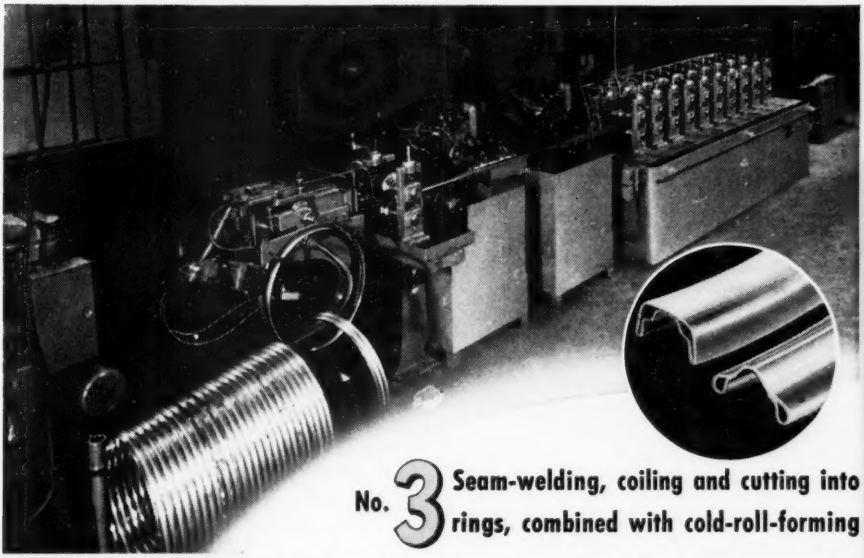
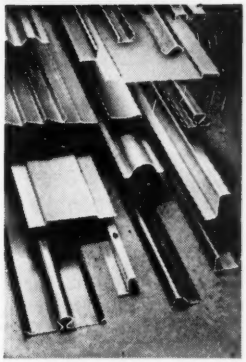


No. 3 Seam-welding, coiling and cutting into rings, combined with cold-roll-forming



Coiled strip from the coil box (extreme right) is here seen being pulled into the cold roll forming machine whence it emerges as a twin tubular section. Continuing on its way, it next passes through two seam welders. An extra roll stand on the second seam welder, helps pull the section through the welders and push it into and through the Yoder coiling and automatic Cut-Off machine. These four operations are performed in a single pass through the continuous production line, with only one operator and a helper—the same as would be required for roll forming alone. This Yoder line makes 6,000 bicycle rims per day. It was installed for the Arnold Schwinn Company, Chicago, world-famed bicycle manufacturers.

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Over the Editor's Desk

Christmas

SO NOW, at the end of the year, comes December—the month of Christmas. The month in which, on the twenty-fifth, most Americans celebrate the birthday of the Child who came to teach us a way of life that would replace discord and contention with peace and prosperity, envy with generosity, hate with love, and selfishness with unselfishness.

We celebrate by being—for a day—unselfish. We give toys to the children, gloves or a teaset to mother, a tie or a box of his favorite cigars to father. And everyone is happy, basking in an atmosphere of love and unselfishness.

Then the shadows lengthen, the candles are snuffed or the lights switched off, and the day comes to a close. And then we wake to another day; a day of activity in the shop or office or field, and the Spirit of Christmas becomes a memory for another year.

The President of our great nation goes back to studying the political situation and its relation to various groups, and to planning a campaign that will appeal to the selfishness of each group and make it easier to sell them a Communist government under the label of human welfare. He is supposedly elected to devote all of his abilities and energies to the task of solving the problems involved in maintaining peace and prosperity for all of the American people, but he goes back to the planning of ways and means to sugar-coat the bitter pill of regimentation so that it can be sold to the public under the false label of "fair deal," knowing full well that his "fair deal" is the opening wedge for State Socialism—under which the liberty of the individual will disappear. What is fair about such a "deal?"

Did you say Christmas? O, but that was yesterday.

The labor union official goes back to planning and organizing methods for

forcing the public—the American people—to contribute to increased wages and other costly advantages for the benefit of his union, all intended to make his own job more secure and give him political leverage. The public generally knows by this time that further wage increases, pensions and other benefits to the labor unions come out of the pockets of the ultimate consumers and therefore comprise a tax on all for the benefit of a few; that periodically the people are forced to ransom our industries and mines by being forced to pay more for coal, automobiles, and other necessities.

Christmas? What has that to do with today? That was yesterday.

The farmer goes back to planning the limit to which he can plant wheat for which he knows there will be no market and which must be stored indefinitely in granaries, potatoes that will be destroyed, eggs that will be stored in caves to rot forever, or grapes that will be fed to the hogs—all to be paid for at high prices (via the tax route) by the city worker and business man.

What did you say about Christmas? O, but that was *yesterday* that we sang carols and gave presents in the name of the Child for whom the day was named.

What hypocrisy! It has been two thousand years since He came to bring us the message that would guide us into the way of peace and happiness and prosperity for all. Will we ever learn?

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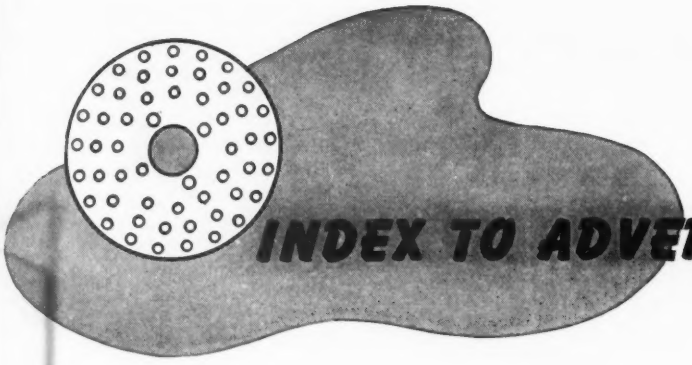

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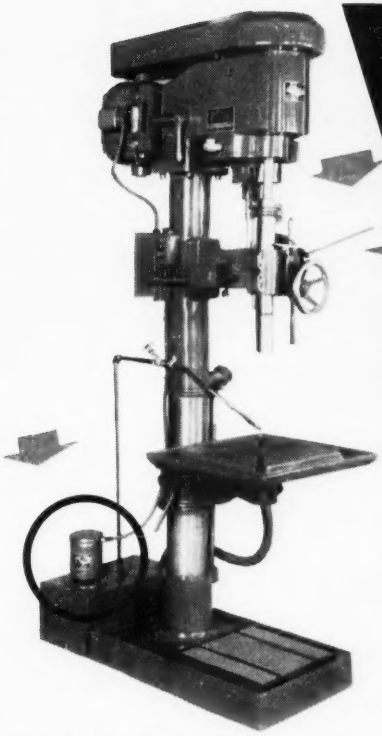

Illustrated is a Sibley model C-20 Drilling machine equipped with model 1-P3-9030 Short 1/10 HP Ruthman Gusher Coolant Pump.

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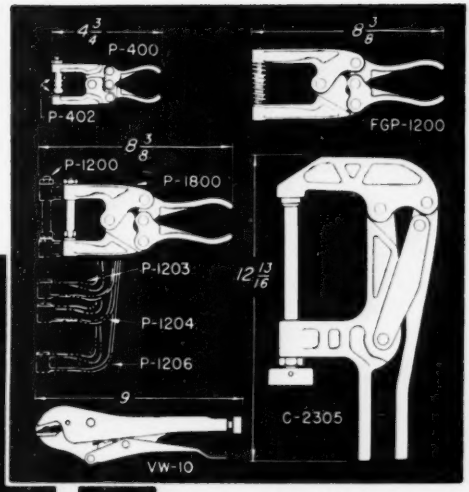

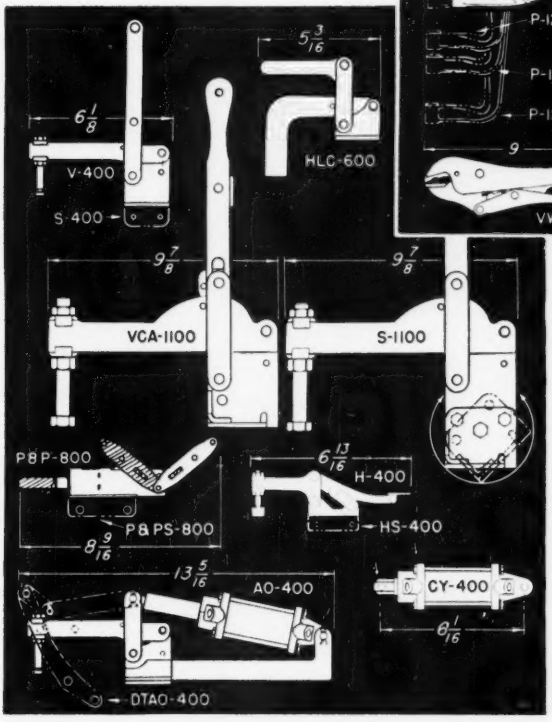

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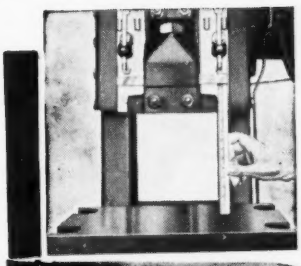

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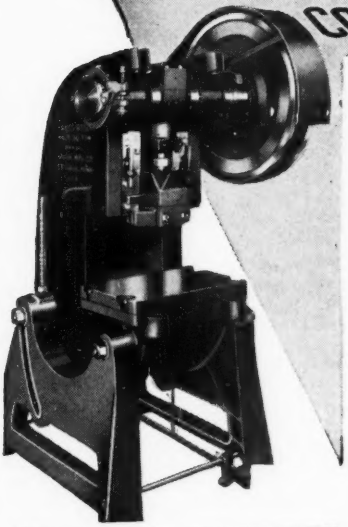

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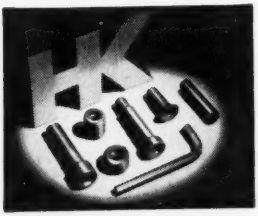

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